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Plastics

VOL. XV. No. 156. MAY, 1950

"*Industry pursues its steady onward movement: deeply conscious that hesitation would be inevitable retrogression, it unflinchingly redoubles its efforts to advance—to win new conquests of peace and prosperity.*"

From an address to King Louis Philippe of France, by Louis Jacques Thénard, on the occasion of the 10th National Exposition, Paris, 1844.

EDITORIALS

B.I.F., 1950

WE are at the half-way line between the 20th and the 21st century, and once again Britain's industrial shop window is wide open for inspection by the world. And here at Earls Court and in Castle Bromwich is this, our plastics industry, with its phenomenal growth both in weight of production and in versatility of application. In 1900 production had not been more than a few hundred tons—by 1939 it had reached 30,000 tons, and to-day has soared to over 100,000 tons. The latter figure is not great when compared with many of the traditional materials of construction, but if we intrude the important factor of specific gravity we may translate this as being equivalent in bulk to nearly 700,000 tons of steel, while final figures of the selling price of finished goods would show the value of the plastics industry in a still more interesting light. It is also nearly four times the aluminium production of Great Britain and on a volume basis equal to the total aluminium production of Canada, the second largest producers in the world!

As for the applications of its products, there is no industry that has not felt its effect and its benefits, technological and æsthetic, and it is for the industrialist, the engineer, the builder, the furniture maker, the textile or toy maker, the hotel manager, the fancy-goods manufacturer, the packing expert, the motorcar, aircraft or radio-television engineer, the chemical manufacturer and, in fact, for the world of technical and other endeavour, that our goods are here displayed for its delectation.

As in the past two years, with the absence of relief from excessive taxation and consequent lowering of purchasing power of the public at home and the recession in exports due to foreign competition and the growth of plastic production and moulding abroad, business continues to be generally difficult, although high standards of production by all the reputable concerns introduces a heartening factor of some stability in this respect.

On the other hand, it is idle and dangerous to pretend that other moulders and fabricators were at all satisfied with the results of the British Industries Fair. It is common knowledge that some do not regard it as an important instrument for attracting new business (which, after all, is generally considered the main and often its sole object) and that all results is a number of cordial meetings with old friends and existing customers—very pleasant and all that, but results which may be obtained by other and less costly means.

It is not surprising, therefore, that those who are not satisfied have given vent to their opinions, and certain important changes in the form of the plastics section at the Fair have emerged. The most important is the decision by the British Plastics Federation to expand its own stand and to offer its space to those members who feel unable to occupy their own large individual stands as formerly. Some 18 firms have accepted this invitation. This is a startling innovation, and many of our famous firms are among the 18 whose individual exhibits will be confined to very small limits. At this stage it would be valueless to comment on the matter, although results may provide a valuable pointer to future procedure.

Another important change takes place at the Birmingham Section of the Fair. Here the stands devoted to plastics and their working appear to be increasing in number and in importance, a fact that will be obvious from a perusal of the analyses and "guides" we give on page 121, etc. Birmingham has always been the show place of the Fair for the heavier industries, and this year it is there only that plastic machinery will be seen. Much of it will be very new and in full operation. A most interesting feature is the decision by some moulders to move their exhibits to Castle Bromwich from Earls Court.

The whole matter of publicity and propaganda by the plastics industry is lined with pitfalls and unknown quantities. Or rather, it is comparatively simple for the producers of the raw material of the industry but extremely difficult for the moulder and fabricator, who may use half a dozen or more entirely different plastic materials and serve two dozen or more different industries, to say nothing of the vast public, albeit indirectly, at the same time.

We have in the past criticized many of the stands in the plastic section as resembling jumble sales rather than giving a coherent and flowing story. This may be good enough for the knowledgeable buyer-technologist who does not blench when on the same table he sees a complicated G.P.O. switchgear, cheek by jowl with a hair drier and a polythene dart-flight. But to the newcomer, and especially to the general public, there is a forest but no visible wood. If there is so much to be gained in teaching the public about plastics—and we believe there is—then we should try to teach it by simple means, and we should devote the story on our stands at least partly to this end. At present we are paying too much lip service to the necessity of fostering public interest and complaining when they arrive at our stands that they are a nuisance and a hindrance to business. We cannot have it both ways.

On the whole, we think that the lessons of the Dorland Hall Exhibition of 1946, which contained the essence of what we're after, were either not observed or have been forgotten.

Federation Lunch

IF any lugubrious or carping note has crept into the writing of the above, let us assure our readers that it was completely dispersed by our attendance at the annual luncheon of the British Plastics Federation on April 19, at the Savoy Hotel, where nobody was worrying about the B.I.F., where reports

of good business, especially in the electrical and industrial sections, were common and optimism was rife among the 250 members and guests.

High Chief Optimist was Mr. C. F. Merriam, whose speech as chairman showed us how we were growing. "Although we may be a young industry," he said, "I think I may claim that we are vigorous and, if American experience and our own plans are any guide, there is every possibility of our becoming quite muscular. In support of this claim, let me quote some figures, which I have taken from the recently issued Report on the Chemical Industry, published by the Association of British Chemical Manufacturers. The productive capacity of the 38 companies making plastic materials who gave their figures was 185,000 tons a year at the end of 1948; these same companies then had 89 schemes of extension in hand, estimated to cost about £22,000,000, which would increase the productive capacity to about 340,000 tons a year by the end of 1952. I want you to note particularly that productive capacity is the method of comparison used, and this is not the same as production, which is substantially less than the productive capacity. As we are planning to double the capacity for producing plastic materials in a period of five years, I think it may be said that we have faith in the future of our industry and that we are prepared to back that faith with money. In addition, the plastic material manufacturers alone, apart from what the moulders and fabricators may be doing, are spending more than £1,000,000 a year on research. Now may I give you some information culled from a recent issue of the American magazine 'Fortune.' Plastics production in the United States has expanded until it is now greater in weight than that of any single non-ferrous metal, including aluminium, and the American plastics industry (in its widest sense) purchases about one-third of the sales turnover of the American chemical industry, and the latter is now rated as its premier industry. I don't suggest that in Britain, with its much smaller population and without the advantage of the indigenous gas and oil available in America, our plastics industry can compare in size, but I think the figures I have quoted give an idea of the progress that is still possible."

Moulding Powder and Shot

Sir Wilfred Eady startled most of us at the Federation lunch, at which he was chief guest—he's one of the big shots at the Treasury. I was shocked (and so were most) to find him quite human and understanding; he was sincerely and strongly complimentary of the structure of the Federation and of the work of Dr. Diamond, and side-splitting in his stories. His imitation of a Geordie miner in pure Geordie was a revelation; his telling of the silly "scientific" report in one of the more stupid of our penny dailies to the effect that "under suitable pressure milk can be compressed to umbrella handles, and vice-versa," which he elaborated by bringing in the Minister of Food, created the funniest of visions of the overnight transformation of firms like Halex and Erinoid into fully working milk factories!

Into the Mouths of Babes

* * *

Let joy be unconfined! The village greens and the practice nets throughout the country will be resounding with the smack of willow bat against plastic cricket ball, for I have just received samples of the latter from the moulders, Wallington, Weston and Co., Ltd., of Frome, Somerset. They are the first ever. Here seems to be another opportunity for pulling the legs of the "There's nothing like leather" enthusiasts, for both Denis Compton and W. J. Edrich admit it's the best practice ball they've used. They say it plays like a leather ball off the bat, that it is in no way detrimental to the bat (I should think not, indeed!) and is of exceptional durability. We wish it the best of bail-removing in the coming season. Alas! Wallington, Weston and Co., Ltd., don't guarantee to improve my own leg-breaks thereby.

Plastics give Cricket a Break

* * *

It was with considerable despondency that I saw some of the results of the recent competition for the best design of "The Ideal Pub" promoted by the Brewers Society and "The Architectural Review." Mind you, the designs were excellent and, apparently, we are to have a lot of chubby barrels about, coloured beer handles and snug corners to give us a cosy feeling and to remind us we're not at the Ritz. Beyond this, there were few details regarding mechanical and chemical properties of the "properties," although I suppose there will be a fair amount of plastics used, from the tubes that carry the beer to the bar and table-tops on which you spill it. Yet I feel great concern that one important item has been omitted. I do not blame the architects, for what can such artists know of every-day strife, but I am reminded of a song I was brought up on, entitled "The Ballad of Samuel Hall." Distinctly of a lower order than "The Ballad of Reading Gaol," it commemorated the sad end of Sammy, once a cheery enough matelot, after a slight fracas in a pub near the Portsmouth Hard. There are some 25 verses, which end with:

Down the Hatch

So I hit him on the pan
With a heavy pewter can . . . pewter can (brightly).
. . . . . .
For the killing of Tom Nod
Here I am in quod . . . am in quod (sadly).

What has this, you may say, to do with the aforesaid competition? As a matter of fact, by diligent research in the Patents Office and elsewhere, I have discovered that poor Samuel might have been living and drinking on the Hard to this day if only the publicans had really had the welfare of their customers at heart. They didn't, and poor Sammy had to swing for it. The nub of the matter lies in the heavy pewter pot—mark it well, heavy and pewter. We really have two possibilities here. When Tom was struck on the bean it is just possible that it was bust because the pewter pot was heavy. But I have found that many pewter pots about Samuel's time contained considerable quantities of lead—this in spite of the Act of Edward I (circa 1300) making admixture punishable by death. Is there any doubt in your mind or mine that the second possibility was death by blood poisoning? What a lesson to the modern pub architect, and will he take it to heart that the only possible material for making pots should be—well, what do you think?

* * *

My private sleuth in Baker Street tells me that "Madame Tussaud's" are fitting polymethylmethacrylate teeth in the heads of their famous models, instead of the wax variety which have been used for more than 100 years. I knew, of course, that none of them had a tongue in its head, but I had also imagined that the tight-lipped villains in the Chamber of Horrors were made tight-lipped to avoid the trouble of moulding top and bottom sets. Perhaps Macaulay's New Zealander, rummaging amongst the ruins of London, will jump to the conclusion that Henry VIII, W. E. Gladstone, Dr. Crippen and Steve Donoghue, all contributed to the National Health Scheme.

Teeth that Bite Not

DOGSBODDY.

Current Trends in Plastics Products and Machinery

THE British Industries Fair which opens to-day, May 8, in London (Earls Court and Olympia) and in Birmingham (Castle Bromwich), is the 28th in the series and the fourth of the post-war Fairs.

As in recent years, the Plastics Section is again at Earls Court, but this year some 18 well-known concerns are jointly occupying one central stand under the ægis of the British Plastics Federation, of which they are member-firms. They are BX Plastics, Ltd., Bakelite, Ltd., British Geon, Ltd., British Moulded Plastics, Ltd., British Resin Products, Ltd., E. K. Cole, Ltd. (Plastics Division), Crystalate, Ltd., De La Rue Extrusions, Ltd., Thomas De La Rue and Co., Ltd. (Plastics Division), Ebonestos, Ltd., Erinoid, Ltd., Halex, Ltd., Insulators, Ltd., Kent Mouldings, Melwood Thermoplastics, Ltd., Mica Products, Ltd., Punfield and Barstow (Mouldings), Ltd., and Scott, Bader and Co., Ltd.

New-comers to the Plastics Section of the Fair at Earls Court this year include Courtaulds, Ltd., Dacrematt, Ltd., Kent Mouldings, Melwood Thermoplastics, Ltd., Phœnix Rubber Co., Ltd., Roanoid, Ltd., and Scott, Bader and Co., Ltd., the last-named having previously been in the Chemical Section. Twelve names which were seen in the Plastics Section last year are no longer represented this year, either here in London or at Castle Bromwich.

The Plastics Section is devoted mainly to the display of raw materials for moulding; semi-finished products such as extrusions, laminates, p.v.c. sheet, p.v.c. leathercloth and film; and finished goods, which include mouldings, extrusions, etc., serving widely different uses in various aspects of industry and in the daily life of the community. That the ramifications of plastics are notable is not only evident from a quick glance at the goods which are displayed, but have been seen equally well in the pictures we have been privileged to publish in these pages month by month for some time past under the title of "Plastics in the Service of Man."

For the greater convenience of visitors to the Fair, we provide a plan of the stands in the Plastics Section at Earls Court, and a tabulated guide to the various classes of products and their end-uses.

At Olympia, considered aside from toys and fancy goods, end-uses are more widely dispersed among goods made of other materials, yet the search for them brings the visitor into contact with many firms who are turning to plastics as materials which ably serve some precise need. This section of the Fair we have also presented in a conveniently summarized form, which we feel will help in guiding the visitor to his requirements.

Even a casual glance at the exhibits at Castle Bromwich, where the Fair caters more especially for the engineering, electrical, building and hardware trades, shows that there is a notable trend for certain concerns to locate themselves here in preference to being in the Plastics Section at Earls Court. New-comers to Castle Bromwich this year include British Celanese, Ltd., E. K. Cole, Ltd., De La Rue Extrusions, Ltd., Thomas De La Rue and Co., Ltd. (Plastics Division), Holoplast, Ltd., I.C.I. Plastics Division, Robert McArd and Co., Ltd., Resinoid and Mica Products, Ltd., Streetly Manufacturing Co., Ltd., and Tanks and Linings, Ltd., several of these names no longer being seen at Earls Court.

Not least important among exhibits at Castle Bromwich are those of the makers of plastics machinery, which continues to show a notable combination of ingenuity and engineering skill in meeting the precise needs of moulding, preforming, extruding, dielectric welding, and all those other operations which are necessary to the making of various semi-finished and finished goods of plastics origin.

The Fair closes its doors on May 19, by which date a goodly number of visitors, who are primarily interested in plastics, their production or use, will have profited in the light of new knowledge and experience forthcoming from within the plastics industry.

"There is no art or science that is too difficult for industry to attain to; it is the gift of tongues, and makes a man understood and valued in all countries, and by all nations; it is the philosopher's stone, that turns all metals, and even stones, into gold, and suffers no want to break into its dwellings; it is the north-west passage, that brings the merchant's ships as soon to him as he can desire," wrote Edward, Lord Clarendon, in 1670. It was a day long before there were such events as trade fairs and industrial exhibitions, yet how truthfully those words have reflected the inner purpose of the B.I.F. ever since its inception.

Exhibits at Earls Court, London

British Plastics Federation (Stands No. R2 and R33)

For the first time in the history of the B.I.F., eighteen member-firms of the British Plastics Federation, which is the national trade association for the British plastics industry, have a combined exhibit in the Plastics Section of the Fair at Earls Court, whereas formerly they had stands of their own.

This joint display, truly representative of the British plastics industry in most if not all its aspects—raw materials, semi-finished and finished products—should considerably assist the visitor with definite inquiries and a minimum of time available in which to seek these requirements.

BX Plastics, Ltd., are manufacturers of high-grade thermoplastics for all purposes; their "Bexoid" cellulose acetate, "Lactoid" casein and "Bexene" p.v.c. thin sheet are all well-known productions, added to which there is moulding powders and film.

Bakelite, Ltd., are well known for their phenolic and urea moulding powders, "Bakelite laminated," "Warerite" decorative sheet and "Vybak" thermoplastic compounds. They also have a notable exhibit at Castle Bromwich.

British Geon, Ltd., supply polyvinyl resins, latices, compounds and pastes. They show electrical grade p.v.c., the "Breon" 200 series of copolymers, and other products of industrial interest.

British Moulded Plastics, Ltd., carry on moulding by compression and injection from all proved types of plastic moulding materials. They are showing the Bush 9-in. table television cabinet, the "Dallas" saxophone and the "Excelvac" vacuum jug.

British Resin Products, Ltd., who are manufacturers of "Cellomold" cellulose acetate moulding powders and "Rockite" phenolic moulding powder, also exhibit "Epok" phenolic, cresylic and cashew nut shell resins for laminating.

E. K. Cole, Ltd. (Plastics Division), make compression and injection mouldings for the radio, electrical and engineering industries. They have a modern tool room for making steel moulds.

Crystalate, Ltd., have a complete organization for the making of mouldings—including

(as in the case of some other exhibitors on this stand), design, tooling, moulding, finishing, assembling and packaging.

De La Rue Extrusions, Ltd., manufacture all types of thermoplastic extrusions, including cellulose acetate butyrate, cellulose acetate, rigid p.v.c., polystyrene, polythene and flexible p.v.c.

Thomas De La Rue and Co., Ltd. (Plastics Division), are the well-known makers of "Formica" laminated board, which is used as a decorative surface. The section through the model of a hotel gives examples of renovations to restaurant, bar, bathrooms, and bedrooms.

Ebonestos Industries, Ltd., provide mouldings for electrical, engineering, motorcar, aircraft, scientific instrument and telephone uses.

Erinoid, Ltd., are recognized manufacturers of casein plastic sheets, rods and tubes, cellulose acetate moulding powders, polystyrene moulding powder, vinyl sheeting, extruded sections and cast resin sheets and shapes.

Halex, Ltd., make injection mouldings, compression mouldings, and fabrications in all types of thermoplastic and thermosetting materials.

Insulators, Ltd., make all types of mouldings, using thermoplastic and thermosetting materials. They have a complete organization which includes experimental and development work for all industries that use mouldings.

Kent Mouldings, among other industrial items, include plastic bobbins for textile machinery.

Melwood Thermoplastics, Ltd., manufacture extruded thermoplastic sections, flexible and rigid for the motorcar, aircraft, electrical, building and light engineering trades. Thin-walled tubing for heat-seal packaging is also shown.

Mica Products, Ltd., provide moulded, fabricated, machined and stamped plastics for all purposes. They are specialists in laminated plastic tubes, bobbins and formers, and plastic insulation components.

Punfield and Barstow (Mouldings), Ltd., are injection moulders in cellulose acetate, polystyrene, polythene, nylon and p.v.c.

Scott Bader and Co., Ltd., manufacture "Marco" thermosetting polyester resins for low-pressure laminating, room temperature casting, and for embedding electrical components.

Armoride, Ltd. (R22)

As manufacturers of plastic leathercloth and related products, this firm is exhibiting a wide range of shades and grains for furniture, coach upholstery, travel goods, shoes, belts, handbags and bookbinding.

British Celanese, Ltd. (R12)

The latest applications of "Celanese" plastics are to be seen on this stand. The display includes "Clarifoil" transparent film which is tough, flexible, waterproof and crystal clear, and is widely used for vision-packaging.

"Celastoid" extruded rods, tubes and sections suggest themselves by their versatility for many different uses in the factory, the house, transport, building and other industries. Typical uses in the case of rods are spectacle sides, musical instrument keys, decorative handles for tools, propelling pencils and display material; in the case of tubes (with metal inserts) for barrier railing and hand railing with wood inserts for perambulator handles, or as a protective covering for tubular furniture, trolleys, etc.

"Celastoil" moulding powder, supplied in a range of colours and in three grades, is used for injection mouldings of all types.

British Ebonite Co., Ltd. (R15)

Ebonite sheet, rod, tube and mouldings are the chief productions of this company. They have a display of tubes up to 9 ft. long; also "Becolite" loaded material for hot climates.

Commercial Plastics, Ltd. (R31)

"Superlon" leathercloth, both supported and unsupported, for handbags, travel goods, upholstery and industrial uses are seen at this stand, where there is also a display of "Fablon" thin p.v.c. sheeting for clothing, curtaining and packaging.

Courtaulds, Ltd. (R10)

The display on this stand is one of cellulose acetate moulding power, transparent acetate film, and extrusions. The film is available in clear, transparent and matt polished grades.

P. B. Cow and Co., Ltd. (R17)

Industrial mouldings, as well as table and picnic ware, toys and fancy goods are being exhibited. Three new lines are an unbreakable beaker, a butter dish and a holder (with lid) for disguising the common glass jar in which jam and similar products come to the consumer.

Dacrematt, Ltd. (R32)

This company specializes in silk-screen printing for plastics sheeting. This is the first occasion that a stand has been taken for the exhibition of screen process printed plastics. They are showing printed film in thick and thin gauges, and also articles made up from sheeting that has been printed.

Dermide, Ltd. (P71)

Leathercloth in p.v.c. and nitrocellulose are the chief products of this concern.

Duraplex (Plastics), Ltd. (R6)

This company manufactures p.v.c. sheeting in calf, pinseal, reptile and various fancy embossings. They are showing many new designs which, we believe, are at the Fair for the first time. In all, there are 50 to 60 new designs and they are giving customers a choice of any design to be confined to their individual selves.

Hornflowa, Ltd. (R26)

Plastic buttons by Hornflowa are noted for their natural beauty of appearance, translucency, sheen and delicate markings, and are available in an infinite range of colours, shades, shapes and sizes. They have countersunk holes, so that there are no sharp edges to wear the thread. This concern also manufactures plastic buckles and combs, and maintains a toolroom service for supplying compression and injection moulding tools to the plastics industry.

Imperial Chemical Industries, Ltd. (Plastics Division). (R11/23)

At Earls Court the entire range of I.C.I. plastics is being shown, the emphasis being on major industrial applications in the lighting and electrical fields, in transportation, chemical, building, fancy goods and packaging industries. A demonstration of the injection moulding of "Alkathene," on a Edgwick type "HY" machine, can be seen, The moulding takes the form of a novel design of eye-bath. Attention is also focused on the new phenolic plant at Wilton, which will be in full production this year.

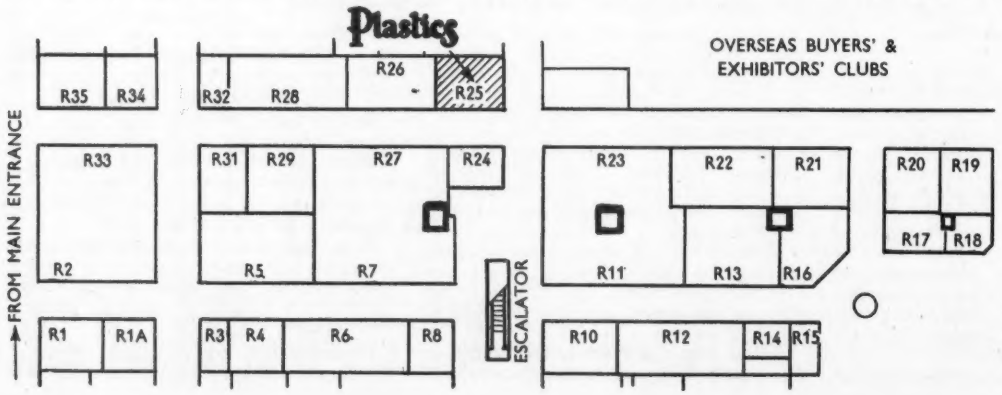
Injection Moulders, Ltd. (R13)

Although plastic toys are one of the main features of this stand, there are also displayed a very representative range of custom mouldings for many industries.

C. and C. Marshall, Ltd. (R21)

Wing piping (also known as anti-squeak, joint moulding and fender welt) for the motorcar industry plays an important part in the extrusion programme of this concern; these wing pipings are made in all standard sizes and in a range which provides completely for every requirement of motorcars and coaches. Although particular shades of colour can be supplied to match coachwork if the quantity warrants it, they point out that the pleasant contrast provided by a jet-black piping of high quality almost invariably achieves a superior effect.

Markmaster, Ltd. (O37), are showing a new machine, the "Markmaster Marathon," for dry-foil printing and marking of brushes,



Plan of Plastics Section (R) on Ground Floor at Earls Court, London.

(A tabulated Summary of the Exhibits in this Section is given on page 121.)

Summary of Plastic Exhibits at Earls Court (London)

Exhibitor	Stand No.	Raw materials for moulding								Finished or semi-finished						
		Casein	Phenolics	Urea and/or Melamine	Cellulose plastics	Vinyl (including polystyrene)	Polythene	Acrylics	Casting resins	Mouldings	Extrusions	Laminates	P.V.C. sheet	P.V.C. leathercloth	Film	Fabrication in acrylic or acetate sheet
Armoride Ltd.	R.22	—	—	—	—	—	—	—	—	—	—	—	×	×	—	—
B.X. Plastics Ltd.	★	×	—	—	×	×	—	—	—	—	×	×	×	—	×	—
Bakelite Ltd.	★	—	×	×	—	×	—	—	—	—	×	×	—	—	—	—
British Celanese Ltd.	R.12	—	—	—	×	—	—	—	—	—	×	×	—	—	×	—
British Ebonite Co. Ltd.	R.15	—	—	—	—	—	—	—	—	×	×	—	—	—	—	—
British Geon Ltd.	★	—	—	—	—	×	—	—	—	—	—	—	—	—	—	—
British Moulded Plastics Ltd.	★	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
British Plastics Federation	R.2, R.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
British Resin Products Ltd.	★	—	×	×	×	—	—	—	—	—	×	—	—	—	—	—
Cole, E. K., Ltd., Plastics Division	★	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Commercial Plastics Ltd.	R.31	—	—	—	—	—	—	—	—	—	—	—	×	×	×	—
Courtaulds Ltd.	R.10	—	—	—	×	—	—	—	—	—	×	—	—	—	×	—
Cow, P. B., and Co., Ltd.	R.17	—	—	—	—	—	—	—	—	×	—	—	×	—	—	—
Cromwells Ltd.	X.31, X.49	—	—	—	—	—	—	—	—	×	—	×	—	—	—	—
Crystalate Ltd.	★	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Dacrematt Ltd.	R.32	—	—	—	—	—	—	—	—	—	Silk screen printing on plastics					—
De La Rue Extrusions Ltd.	★	—	—	—	—	—	—	—	—	—	×	×	—	—	—	—
De La Rue, Thomas, and Co., Ltd., Plastics Division	★	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—
Dermide Ltd.	P.71	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—
Dunlop Special Products Ltd.	R.16	—	—	—	—	—	—	—	—	—	×	—	×	×	—	—
Duraplex (Plastics) Ltd.	R.6	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—
Ebonestos Industries Ltd.	★	—	—	—	—	—	—	—	—	×	—	×	—	—	—	×
Erinoid Ltd.	★	×	—	—	×	×	—	—	—	—	×	—	×	—	—	×
Halex Ltd.	★	—	—	—	—	—	—	—	—	×	—	—	—	—	—	×
Hornflowa Ltd.	R.26	—	—	×	—	—	—	—	—	×	—	—	—	—	—	—
I.C.I. Ltd., Plastics Division	R.11, R.23	—	×	×	—	×	×	×	×	×	×	—	×	×	×	×
Injection Moulders Ltd.	R.13	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Insulators Ltd.	★	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Kent Mouldings	★	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Kenverne Ltd.	R.14	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
Locke (Leeds), Ltd.	W.134	—	—	—	—	—	—	—	—	—	—	—	×	×	—	—
Marshall, C. and C., Ltd.	R.21	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—
Melwood Thermoplastics Ltd.	★	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—
Mentmore Manufacturing Co. Ltd., Plastics Division	R.35	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Mica Products Ltd.	★	—	—	—	—	—	—	—	—	×	—	×	—	—	—	×
Moulded Components (Jablo) Ltd.	R.18	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—
P.A. Permuta (Plastics) Ltd.	R.7, R.27	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Phœnix Rubber Co. Ltd.	R.3	—	—	—	×	×	×	—	—	—	—	—	×	—	×	—
"Plastics" (Temple Press Ltd.)	R.25	—	—	—	—	—	—	—	—	Mouldings from various sources						—
Punfield and Barstow (Mouldings) Ltd.	★	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Roanoid Ltd.	R.19	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Scott, Bader and Co. Ltd.	★	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—
Smith, Stanley and Co.	R.24	—	—	—	—	—	—	—	—	—	×	—	×	—	—	—
Stone and Simmons	R.34	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
Storeys of Lancaster (Storey Bros. and Co., Ltd.)	P.70	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
Thermo-Plastics Ltd.	R.29	—	—	—	—	—	—	—	—	×	—	×	—	—	—	×
Triplex Safety Glass Co., Ltd.	R.20	—	—	—	—	—	—	×	—	—	—	—	—	—	—	×
Vinyl Products Ltd. and Vinatex Ltd.	R.1	—	—	—	×	×	—	—	—	—	—	—	×	×	—	—
Wallington, Weston and Co., Ltd.	R.5	—	—	—	—	×	—	—	—	—	—	—	×	—	—	—

★ British Plastics Federation Stand, R.2 and R.33.

containers, films, toys, etc., and other plastic goods. It is claimed to be capable of marking goods at rates of 1,500 to 2,000 per hour in two or three colours.

Mentmore Manufacturing Co., Ltd. (R35)

Injection mouldings in acetate, polystyrene, polythene and p.v.c. to customers' requirements in all trades are supplied by the Plastics Division of this company. They exhibit moulded toys, buttons, radio parts and other productions.

Moulded Components (Jablo), Ltd. (R18)

On this stand can be seen a new non-inflammable, lightweight, buoyant cushioning known as "Aero-Jablex," which is of exceptional durability and lighter than any other form of sponge cushioning. It is practically non-perishable and can be provided in solid or ribbed formation, in several degrees of hardness, and in a range of colours. Thickness ranges from 2 ins. to 4 ins.; maximum sizes 4 ft. by 2 ft. 6 ins.

In many cases of upholstery use, springs can be entirely eliminated by building up sections of "Aero-Jablex." Adhesives can be supplied for fixing leather, fabric, wood and "Dural" to this new cushioning.

The material has excellent electrical insulation properties, with high breakdown strength. Moisture absorption is approx. 0.15 per cent. by volume after two weeks' total immersion in water at 65 degrees F. Thermal conductivity is approx. 0.20 B.Th.U. As regards buoyancy, 1 cu. ft. of "Aero-Jablex," floating in water, will support about 60 lb. of steel indefinitely. The material is self-extinguishing and conforms to British Standard 476 for fire tests on non-inflammable materials. Weight is approx. 2½ lb. per cu. ft. for the "ribbed" type and 3½ lb. for the "solid" type.

James North and Sons, Ltd. (P33)

The complete range of p.v.c. industrial clothing will be shown on this stand in the Leather Section. Gloves, one-finger mittens, and mittens are made under B.P. 624,795, and afford complete protection from all industrial chemicals, oils, gases, and greases with proved resistance to abrasion up to 20 times greater than leather. The range of p.v.c. garments include aprons, complete overall clothing and headgear. Shown for the first time at this year's Fair is a specially supple men's p.v.c. glove for laboratory work.

Optoplas Manufacturing Co., Ltd. (R4)

Spectacle frames fabricated by this company are exhibited.

P.A. Permuta (Plastics), Ltd. (R7/27)

Plastic toys, toy furniture, toiletware, smokers' requisites and advertising novelties are shown on this stand.

Phœnix Rubber Co., Ltd. (R3)

This company are pioneers in the mass production of plastic flooring. Their "Phenco" vinyl continuous flooring is made in rolls 36 ins. wide, 3/32 in. thick and 12 yards long—beige, green, red, brown, black and various marbled effects. It is non-slip, dustless and easily kept clean; also hard wearing, with high resistance to oil, grease

Mouldings, Extrusions and End-uses of Plastics at Earls Court (London)

This tabulated analysis does not necessarily imply that actual examples are exhibited on the stands mentioned, but that these end-uses are generally indicated in the case of some of the exhibitors

Exhibitor	Stand No.	Electrical industry	Radio and television	Engineering components and tools	Textile machinery	Motorcar parts	Aircraft/ shipbuilding	Structural material, including p.v.c. flooring	Sanitary fittings, refrigerator parts	Builders' hardware	Furniture	Soft furnishings/ upholstery	Domestic ware	Travel goods	Sports goods	Toys	Hard haberdashery/ fancy goods	Packaging	Clothing	Display signs and fittings
Armoride, Ltd.	R.22	—	—	—	—	—	—	—	—	—	—	X	—	X	—	—	—	—	X	—
Aston and Co.	P.23	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	X	—	—	—
Attewell, B., and Sons, Ltd.	X.34	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—
BX Plastics, Ltd.	★	X	X	—	—	—	—	X	—	—	—	X	—	X	—	—	—	X	—	—
Bakelite, Ltd.	★	X	X	X	X	X	X	X	—	X	X	—	X	—	—	X	X	—	—	—
Belstaff Manufacturing Co., Ltd.	W.78	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—
Betterway Panels, Ltd.	X.43	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—
British Celanese, Ltd.	R.12	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	X	—	—
British Ebonite Co., Ltd.	R.15	X	X	X	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
British Geon, Ltd.	★	X	—	X	—	X	X	—	X	—	X	X	X	X	—	X	X	—	X	—
British Moulded Plastics, Ltd.	★	X	X	X	—	X	—	—	—	X	X	—	X	—	—	X	X	X	—	—
British Resin Products, Ltd.	★	X	X	X	X	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—
Cole, E. K., Ltd., Plastics Division	★	X	X	X	—	X	—	—	X	—	X	—	—	X	—	—	X	X	—	—
Commercial Plastics, Ltd.	R.31	X	—	—	—	X	X	—	—	—	X	X	—	X	—	—	X	X	X	—
Courtaulds, Ltd.	R.10	—	—	—	—	X	—	—	—	—	—	—	X	—	—	X	X	X	—	—
Cow, P. B., and Co., Ltd.	R.17	X	—	—	—	—	X	—	—	—	—	X	X	X	—	X	X	—	—	—
Cromwells, Ltd.	X.31, X.49	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	X	—	—
Crystalate, Ltd.	★	X	X	X	—	X	X	—	—	—	—	—	X	—	—	X	X	X	—	—
Dacrematt, Ltd.	R.32	—	—	—	—	—	—	—	—	—	—	—	—	Silk screen printing on plastics					—	—
De La Rue Extrusions, Ltd	★	—	—	—	—	X	—	—	—	X	—	—	—	—	X	—	X	X	—	—
De La Rue, Thomas, and Co., Ltd., Plastics Division	★	X	X	X	X	—	X	X	—	—	X	—	X	—	—	—	—	—	—	—
Dermide, Ltd.	P.71	—	X	—	—	—	—	—	—	—	X	X	—	X	—	—	X	—	X	—
Dunlop Special Products, Ltd.	R.16	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
Dunstable Showcases	V.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X
Duraplex (Plastics), Ltd.	R.6	—	—	—	—	—	—	—	—	—	—	X	—	X	—	X	X	—	—	—
Ebonestos Industries, Ltd.	★	X	X	X	—	X	X	—	—	—	—	—	X	—	—	X	X	—	—	—
Erinoid, Ltd.	★	—	—	—	—	X	—	—	—	X	—	X	—	—	—	X	X	—	—	—
General Lighting Equipment Co., Ltd.	X.16	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—
Goodearl Bros., Ltd.	X 65	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—
Halex, Ltd.	★	X	X	X	—	—	X	—	—	—	—	—	X	—	X	—	X	—	—	—
Harris and Sheldon, Ltd.	W.64 W.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X
Hislop, J. W. S., Ltd.	W.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—
Hornflows, Ltd.	R.26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—
I.C.I., Ltd., Plastics Division	R.11, R.23	X	X	X	—	X	X	—	X	X	—	X	X	X	—	X	X	X	—	—
Injection Moulders, Ltd.	R.13	X	—	—	—	X	—	—	—	—	—	—	X	—	—	X	X	—	—	X
Insulators, Ltd.	★	X	X	X	—	X	—	—	—	—	—	—	X	—	—	X	X	—	—	—
Kent Mouldings	★	X	X	X	X	—	X	—	—	—	—	—	X	—	—	X	—	—	—	—
Kenverne, Ltd.	R.14	—	—	—	—	—	—	—	—	—	—	X	X	—	—	X	—	—	—	—
Markmaster, Ltd.	O.37	—	—	—	—	—	—	—	—	—	—	—	—	Marking machines or plastics					—	—
Marshall, C. and C., Ltd.	R.21	—	X	—	—	X	—	—	—	—	—	X	—	X	X	X	X	—	—	—
Masson, Seeley and Co., Ltd.	O.36	—	—	—	—	—	—	—	—	—	—	—	—	Marking machines for plastics					—	—
Melwood Thermoplastics Ltd.	★	X	—	—	—	X	—	—	—	X	—	X	—	X	—	—	X	—	—	—
Mentmore Manufacturing Co., Ltd., Plastics Division	R.35	X	X	—	—	—	—	—	—	—	—	—	—	—	—	X	X	X	—	—
Merriglo, Ltd.	P.73	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	X	—	—	—
Mica Products, Ltd.	★	X	X	X	—	X	X	—	—	—	—	—	X	—	—	X	X	—	—	—
Moulded Components (Jablo) Ltd.	R.18	X	—	X	X	—	X	X	—	X	X	X	—	—	—	—	—	X	—	—
North, James, and Sons, Ltd.	P.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—
Orlik, L., Ltd.	P.57	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	X	—	—	—
P.A. Permuta (Plastics), Ltd.	R.7, R.27	—	—	—	—	—	—	—	—	—	—	—	X	X	—	X	X	—	—	—
Pell, P., and Sons, Ltd.	P.42	—	—	—	—	—	—	—	—	—	—	—	X	X	—	—	—	—	—	—
Perry, John, and Co. (Plastics), Ltd.	V.8	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—
Phœnix Rubber Co., Ltd.	R.3	—	—	—	—	X	X	X	—	X	—	X	X	—	—	—	—	—	—	—
Plasticraft, Ltd.	R.28	—	—	—	—	—	—	—	—	—	—	—	X	—	—	X	X	—	—	—
"Plastics" (Temple Press Ltd.)	R.25	—	—	Mouldings of notable interest from various sources								—	—	—	—	—	—	—	—	—
Punfield and Barstow (Mouldings) Ltd.	★	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Risboro' Furniture, Ltd.	X.65	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—
Roanoid, Ltd.	R.19	—	—	—	—	—	X	—	—	X	—	—	X	—	—	—	—	—	—	—
Sage, Fredk. (Display Fittings), Ltd.	O.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X
Scott, Bader and Co., Ltd.	★	X	—	—	—	X	X	—	—	—	—	—	—	—	—	—	X	—	—	—
Smith, Stanley and Co.	R.24	—	—	—	—	—	—	—	—	—	—	X	—	X	—	—	—	—	—	—
Splendor, Ltd.	W.22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	X	—
Stone and Simmons	R.34	—	—	—	—	—	—	X	—	—	—	—	X	—	—	—	X	—	—	—
Swallow Raincoats, Ltd.	W.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—
Teleezee Productions, Ltd.	O.31	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X
Thermo-Plastics, Ltd.	R.29	X	X	X	—	—	X	—	X	X	—	—	X	—	—	—	—	—	—	X
Tidiwear, Ltd.	W.20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—
Triplex Safety Glass Co., Ltd.	R.20	X	—	—	—	X	X	—	X	—	—	—	X	—	—	—	—	—	—	—
Unerman, J., and Sons, Ltd.	X.26	—	—	—	—	—	—	—	—	X	X	—	—	—	—	—	—	—	—	—
Vinyl Products, Ltd., and Vinatex, Ltd.	R.1	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—
Wallington, Weston and Co., Ltd.	R.5	X	—	—	—	X	—	X	—	—	—	X	—	—	X	—	—	—	—	—
Weldyne Co.	P.74	—	—	—	—	—	—	—	—	—	—	—	—	X	—	X	X	—	X	—

★ British Plastics Federation Stand, R.2 and R.33.

and chemicals. For wear, indentation, pliability, water absorption and non-inflammability, finished material conforms to British Standards 476/1932, 386/1936 and 810/1938. Also exhibited are "Phenco" pressed tiles.

Roanoid, Ltd. (R19)

Plastic hardware and general mouldings for a variety of uses are displayed here. This firm specializes in providing interior fittings and furniture accessories moulded from phenolic and urea plastics, for use in ships.

Stanley Smith and Co. (R24)

The display on this stand relates to "Vitrone" flexible and rigid p.v.c. sheeting and extrusions; "Vitrite" synthetic resin adhesives are also exhibited.

Stone and Simmons (R34)

A variety of plastic tableware ranging from soup bowls, egg containers, divided food dishes and cruet sets to Chinese chopsticks, at this stand, has a background of "Polytile" plastic wall tiles.

An interesting production making its first public appearance at the Fair, is a mustard pot which ejects a portion of mustard by an ingenious push-button device. The pot and mechanism consists of six mouldings in transparent and cream polystyrene.

Thermo-Plastics, Ltd. (R29)

Among their many achievements in the moulding and fabrication of plastics, the display at this stand will include a new revolving sandwich container made wholly from "Perspex." They also exhibit sanitary fittings, refrigerator components, display fittings, advertising signs, and travel goods, the latter of post-formed laminate.

Triplex Safety Glass Co., Ltd. (R20)

This company makes "Perspex" reflectors and diffusers for industrial, domestic and public lighting, and also sanitaryware for household and caravan use. Television lenses are also exhibited.

Vinyl Products, Ltd. and Vinatex, Ltd. (R1)

The activities of Vinyl Products, Ltd., have now divided into two sections. That concerned with polyvinyl chloride and allied products will be shown by their subsidiary, Vinatex, Ltd. Here, impressive castings in plaster, cast resin, and concrete, indicate the increasing use of "Vinamold" hot melt compounds; p.v.c. compounds and pastes are also shown in a range of grades and colours for extrusion, calendering, and coating. The main display presents what is probably the largest complete range of p.v.c. sheet products presented by any one company, including press polished sheeting, plain and printed calendered sheeting from .004 in. thickness and up to 60 ins. in width; also pressed and roller embossed sheeting in single and two-tone effects, and high-quality p.v.c.-coated cloth and paper.

Wallington, Weston and Co., Ltd. (R5)

This company (incorporating Frome Plastics, Ltd.) are showing plastic materials and finished goods. The main feature is a range of unbacked and backed p.v.c. sheeting. This includes "Fromocene," a .007-in./.009-in. p.v.c. sheet, 48 ins. wide, with beautiful silk-like finish and drape; "Fromotan" unbacked sheet in thicknesses of .008 in., .012 in. and .022 in. and 48-in. width, of which several interesting new designs are shown for the first time; and "Fromotex," a heavier type of backed embossed leathercloth. "Muraplas" wall tiles, consisting of a thin laminate with a high-gloss vinyl surface, are a new product of the company which will be shown on the same stand by Porosan, Ltd., who are the selling agents. "Sondahl," a new insulating material for the electrical industry, is another product shown for the first time." Fromoprene," a laminate of resin-coated paper bonded with synthetic rubber, was developed during the war for electrolytic condensers. Also shown are cricket balls and dart-boards based on p.v.c.

Exhibits at Olympia, London

EXHIBITS at Olympia of interest to manufacturers and users of plastics cover such a wide range that we can only give the barest details. Exhibitors here include those who are showing chemicals used in the plastics industry, as well as a variety of finished goods. A summary of these finished goods, classified according to their respective sections of the Fair appears on this and the following page. There are also at Olympia a number of exhibitors of equipment, mainly for the making and finishing of plastics; heavy machinery for the industry will be found in the Birmingham Section of the Fair at Castle Bromwich, and is described under that section.

Chemicals

Section B, on the ground floor, will house many stands showing resins, plasticizers and solvents, etc.

Coalite and Chemical Products, Ltd. (B35), are showing a special range of monohydric and dihydric phenols which find use in resin chemistry, and tri-xylenyl phosphate, a plasticizer with many good properties which make it popular for vinyl compounds.

The firms of most interest to the plastics industry, represented on the stand of **The Distillers Co., Ltd.** (B17) and its associate companies are **British Geon, Ltd.**, and **British Resin Products, Ltd.**

The factories of these two companies at Barry, Glamorgan, are adjacent and many services are shared. This year's display is symbolic of this close link between them in the production of the well-known "Geon," "Rockite," "Cellomold," "Epok," "Cellobond" and "Distrene" raw materials for the plastics industry. The exhibits aim to show how the valuable properties inherent in these primary resins, etc., are carried forward into the secondary products made from them. It is usually in such secondary forms that the basic properties of the raw materials are eventually employed to meet essential needs in a wide range of industries. Information on the properties of these basic raw materials, and addresses of manufacturers of various products made therefrom, will be available on both stands. **British Industrial Solvents, Ltd.**, in the same group, are important manufacturers of a large range of plasticizers, solvents and organic intermediates.

Dohm, Ltd. (B11), are specialists in pulverizing, grading and refining raw materials. They also produce "Castogel" flexible mould hot-melt compound and a cork-filled vinyl flooring material.

The stand of **Imperial Chemical Industries, Ltd.** (B12), is of general interest showing the world-wide interests of the large organization, many sections of which cater directly or indirectly for the plastics industry. "Lustrex" polystyrene moulding crystals which will be in production for the first time in this country later this year are of great interest on the stand of **Monsanto Chemicals, Ltd.** (B1). "Aroclors" halogenated di-phenyls shown by this company are used as plasticizers/extenders in vinyl plastics. **Oxirane, Ltd.** (B31), are showing ethanolamines and "Oxitols," glycol ethers.

Vinyl Products, Ltd. (B44) are exhibiting polymer solutions and emulsions including polybutyl methacrylate, polymethyl methacrylate, polystyrene and copolymers. A special feature on the stand is a range of polyvinyl emulsions and polymer solutions.

A. Boake Roberts and Co., Ltd. (B16 and B23) are showing a wide range of "Abrac" resins, plasticizers, esters and other chemicals of use to the industry. **Brotherton and Co., Ltd.** (B14), and **United Coke and Chemicals Co., Ltd.** (B25), are both manufacturers of coal-tar products on which the synthetic resin industry depends. **Lankro Chemicals,**

Summary of Finished Plastics Goods Exhibited at Olympia (London)

Scientific and Optical Goods, Ground Floor, Section C

Holborn Optical Co., Ltd.	C.28	Xylonite and acetate spectacle frames.
Obrig Laboratories (Great Britain), Ltd.	C.66	Contact lenses.
Pifco, Ltd.	C.82	Massaging appliances, hair driers in moulded housing.
Shakespeare, W. H., and Sons	C.39	Acrylic artificial human eyes.

Chemists Supplies, Ground Floor, Section D

Eylure, Ltd.	D.50	Theatrical make-up accessories, including artificial eyelashes and fingernails, brushes, etc.
Viscose Development Co., Ltd.	D.15	Moulded closures and containers.

Office Appliances, Ground Floor, Section F

Shipton, E., and Co., Ltd.	F.69	Telephone equipment, compression and injection mouldings, 20-oz. and 40-oz. polythene bottles.

Sports Goods, Ground Floor, Section G

Giles, L., and Co.	G.28	"Kwiz" polythene dart flights and plastic darts cases.
Lee, M., and Sons, Ltd.	G.38	Fishing tackle, all plastic mechanical railway.
Milwards Fishing Tackle, Ltd.	G.3	Fly and spinning lines in "Terylene" polyester yarn, on plastic spools. Plastic flybox.
Unicorn Products, Ltd.	G.13	Dart flights, fitted darts cases.

Musical Instruments, Ground Floor, Section H

Dallas, John E., and Sons Ltd.	H.16	Musical toys.
Hohner	H.18	Harmonicas, musical-box novelties.
Herrburger Brooks, Ltd.	H.4	Piano key makers, ivory cutters, moulders.

Jewellery, Watches, etc., Ground Floor, Section J

Bands, Ltd.	J.308	Watch glasses in cellulose acetate and acrylics.
Potters (London), Ltd.	J.227	Display fittings.
Phoenix Straps, Ltd.	J.325	Watch straps.
United Kingdom Clock Co., Ltd.	J.302	Clocks in moulded cases.
Winterbourne, J. E. V., Ltd.	J.302	Clock cases.

Ltd. (B31) and **Howards and Sons, Ltd.** (B15) exhibit plasticizers among their range of chemicals.

The Watford Chemical Co., Ltd., are exhibiting for the first time new synthetic drying oils under the name of "Watwood Oil" for the coating industries. Plasticizers shown are dioctyl phthalate esters, dibutyl phthalate butyl oleate and others.

Machinery

Although most machinery manufacturers are exhibiting at Birmingham, several examples of special machinery and instruments are at Olympia.

Airmec Laboratories, Ltd. (C14), are manufacturers of H.F. heaters and high-voltage insulation testers. **W. Edwards and Co. (London), Ltd.** (C56), exhibit a range of vacuum pumps and vacuum coating equipment. **Elliott Brothers (London), Ltd.** (C26), show electrical measuring instruments and automatic process control equipment. A new rotary tablet machine and a new stainless steel mixer are on the stand of **Manesty Machines, Ltd.** (D12), besides their standard preforming machines. **Masson, Seeley and Co., Ltd.** (F100), are showing the "Masseeley Universal Unit," a simply operated machine which marks finished goods of all descriptions with relief or embossed lettering, etc.

Another marking machine shown in the office appliances section is the "Rejafix" combined marking and printing machine shown by **Rejafix, Ltd.** (F105).

Finished Goods

More than 100 exhibitors throughout the various sections of the fair at Olympia are showing products made either predominantly in plastic materials or incorporating plastic components in important functions. As might be expected, a considerable proportion of these manufacturers are to be found in the toy section and the fancy-goods section, both established fields for moulded and fabricated plastics.

However, exhibits of considerable interest may be seen in sections for scientific and optical instruments, office appliances, sports goods, musical instruments, jeweller's equipment, etc. Many of these uses are listed in the summary of finished plastics articles on this and the preceding page.

The use of acrylic resins in the medical field is represented by **Obrig Laboratories (Great Britain), Ltd.** (C66), makers of contact lenses, and **W. H. Shakespeare and Sons** (C39), who make artificial human eyes from acrylics, two uses where the light weight and less fragile nature of the material offer great advantages over glass.

E. Shipton and Co., Ltd. (F69), a versatile firm, who through their interest in telecommunication equipment have acquired considerable experience in the use of polythene are for the first time showing injection-moulded polythene bottles of 20-oz. and 40-oz. capacity. These were developed for the transportation of valuable drugs, where complete freedom from breakage danger (which permits the use of simpler outer packing) and light weight have proved a great advantage over the glass bottle. The bottle is coloured brilliant blue, thus affording adequate light protection.

M. Lee and Sons, Ltd. (G38) show a mechanical train which, apart from the metal spring, is made up entirely of plastic components, including rails, gears and movement.

Brushware, 1st Floor, Section K

Addis, Ltd.	K.20	Plastic handled brushes of all types.
Benwell, H. G., and Co., Ltd.	K.6	Shaving brushes with plastic handles.
Coates Brushes, Ltd.	K.12	Toilet brushes.
Hindes, Ltd.	K.16	"Perspex" nylon-filled brushes.

Fancy Goods, 1st Floor, Section L

Aberdeen Combworks, Ltd.	L.90	Combs, hair slides, shoe lifts, etc., of realhorn, "Keronyx" and "Aberoid" casein combs, "Nuroid" thermo-plastic materials.
British Astral Co. Ltd.	L.50	Electrical accessories and plastic articles.
Buttons, Ltd.	L.123	Buttons, buckles, slides.
Carrendale, Rowland Ltd.	L.19	Lampshades.
Colfast Buttons, Ltd.	L.118	Subsidiary of B.I.P. group, manufacturing colour-fast buttons.
Combex, Ltd.	L.127	Metal-plated hair slides, brooches, novelties, etc.
Fentocraft, Ltd.	L.85	Hand decorated fancy goods, food containers and covers.
Godfrey Lampshades, Ltd.	L.91	Lampshades and special lampshade adhesive.
Gordon, H. J., and Sons, Ltd.	L.72	Novelties in household and fancy goods, display and advertising.
Holloway, E. R., Ltd.	L.111	"Barnet" hair combs and fancy moulded articles.
Jarrett, Rainsford and Laughton, Ltd.	L.132	Combs, slides, coat hangers, sun glasses, food containers, stationers' sundries.
Jekmoth Home Stores, Ltd.	L.130	Insectproof clothes storage bags.
Mendle Bros. Ltd.	L.11	Tableware, haberdashery in cellulose acetate, "Perspex" and "Alkathene."
New Art Manufacturing Co., Ltd.	L.46	Nursery accessories.
Plastic Fashions, Ltd.	L.109	Costume jewellery, hair ornaments, slides and combs, fancy goods, novelties, custom moulders for cosmetic containers.
Plastic Fasteners, Ltd.	L.57	"Movitex" display cards with changeable letters fixed on perforated sheet.
Sedley, P.	L.93	Plastic pegs, "Plasto-fan," toys and games.
Service Button Co., Ltd., The	L.119	Casein buttons, buckles, slides.
Sign and Display Craft, Ltd. (incorporating the Budgettelle Co.)	L.59	Table mats, signs and displays.
Stanmore, Howard, Ltd.	L.85	Souvenir articles with special crests, views or designs.
Toilet Goods Manufacturing Co. Ltd.	L.117	Advertising novelties, leathercloth bags, purse, etc.
Twinco, Ltd.	L.133	"Table-Talk" flexible tumblers, combs, slides, coat hangers, sun glasses, bowls, etc.
Universal Plastics, Ltd.	L.60	Tableware, fancy goods, toys, haberdashery, radio and electrical components.
Walmsley and Lea, Ltd.	L.124	Casein buttons, buckles, etc., games counters and chips, dice.
Weil, Arthur, Ltd.	L.64	Costume jewellery.
Wills, Arnold, and Co. Ltd.	L.125	Belts, braces, watch straps, etc.

Stationery and Stationers' Sundries, 1st Floor, Section M

Cellulose Wadding Supplies, Ltd.	M.136	Cellulose wadding products.
Chiltern Paper Products, Ltd.	M.70a	Cellulose acetate boxes, wrappers, tubes, packs, etc.
Christie, H., Ltd.	M.107	Penholders, scholastic and advertising novelties.
Jones, William, Clifton and Co., Ltd.	M.44	Embossing presses, plastic fabrications, showcards.
Josalex, Ltd.	M.90	Pencil sharpeners, unbreakable plastic ware, floating toys.
Miles-Martin Pen Co., Ltd., The	M.103	"Biro" ballpoint pens.
Myers, M., and Sons Ltd.	M.5	Stationers' sundries, injection mouldings, cosmetic containers.
Olympic Industries, Ltd.	M.52	"Swiveldisk" loose-leaf binding system.
Pakcel, Ltd.	M.11	Transparent film packaging.
Silk Screen Arts, Ltd.	M.123	Silk screen printing and paint design on plastic materials.
Unique Slide Rule Co.	M.38	Slide rules, set-squares.
Wolffing, S., Ltd.	M.105	Stationery sundries, advertising novelties.
Wyvern Fountain Pen Co., Ltd.	M.97	Pens and pencil in moulded display package.

Toys and Games, 2nd Floor, Section N

A. and A. Merchandising Co. Ltd.	N.45	"Quintex" sleeping-eye doll.
Abbey Corinthian Games Co.	N.84	"Makimor" plastic constructional set, darts in plastic cases.
Airfix Products, Ltd.	N.22	Aquarium and alphabet bricks.
Aitken, Roy, and Partners	N.68	"Ducky" child's plastic chamberpot. "Soapsub" floating soapholder.
Allen, Fred H., Ltd.	N.82	Plastic mosaics, toy snowstorm.
Bell (Toys and Games) Ltd.	N.5	Indoor games, building toys.
Cascelloid, Ltd.	N.117	"Palitoy" dolls, rattles, train sets.
Chad Valley Co. Ltd., The	N.157	Building bricks, tiddleywinks, roulette wheel and battery-operated house telephone.
Clements, R. A. (London), Ltd.	N.133	Toy tea sets, Easter eggs, beach balls.
Coleman, Cecil, Ltd., London	N.155	Money box, toy fish.
Cowan, de Groot, Ltd.	N.20	Plastic tea sets, telephones, furniture, musical toys.
Cowan, J (Dolls) Ltd.	N.6	"Roddy" plastic dolls, and plastic harmonicas.
Dandy Toys, Ltd.	N.62	Educational playthings, teething rings.
E.V.B. Plastics, Ltd.	N.75	Television set, paint palette, teapot, ferry-boat with car.
Electronic Developments (Surrey) Ltd.	N.3	Scale-model accessories.
Fairylite Moulded Plastics Ltd.	N.120	Dolls, toys and games.
Funtaso, Ltd.	N.32a	Moulded building bricks with coloured windows.
Glasman, J. and H., Ltd.	N.128	Toys and novelty goods.
Goodfellow, G.	N.23	Injection-moulded baby dolls, alphabet and wood building sets, bath toys.
Graham Bros.	N.120	Plastic and rubber toys and games.
Grovewell, Ltd.	N.9	Watercolours in plastic boxes, flexible ice-cube containers.
Harris, Marcus, and Lewis, Ltd.	N.65	Dolls, tops, tea sets.
International Model Aircraft, Ltd.	N.168	"Penguin" plastic scale-model aircraft.
Kiddicraft, Ltd.	N.146	Educational toys, rattles, teething rings, building toys.
Kleeman, O. and M., Ltd.	N.161	Toys, dolls, rattles, combs, sun glasses, hair slides, coat hangers, fancy goods.
Knight, Lewis, Ltd.	N.63	Musical toys, balloons.
Lawley and Page, Ltd.	N.18	Dolls and toys.
Liddiatt, A.W., and Co., Ltd.	N.116	Novelty toys.
Lines Bros., Ltd.	N.165	"Tri-Ang" clockwork toys, educational toys.
Marx, Louis, and Co., Ltd.	N.156	Tops, toy racers, novelties.
Mayer, K. J.	N.142	Dolls and toys.
Mettoy Co., Ltd., The	N.149	Mechanical trains, cars, models.
Mitchell Plastics, Ltd.	N.31	P.v.c. soft dolls, "Mormit" p.v.c. sink waste trays, car-spring covers, trade moulders.
Napier, E. M., Ltd.	N.119	Snow crystals, tea sets, indoor games.
New Almar Products, Ltd.	N.81	Toy pianos, musical toys.
Pattison, Donald, Ltd.	N.131	Trumpets, musical toys.
Pedigree Soft Toys, Ltd.	N.165	"Delite" plastic dolls.
Projects (Coventry) Ltd.	N.8	"Walt Disney Characters" dolls, nursery accessories.
Randall, J. and L., Ltd.	N.118	Tea sets, games, educational and musical toys.
Rees, L., and Co. Ltd.	N.148	"Ellar" games and toys, dolls, house cinema.
Salter, Thomas, Ltd.	N.150	Dominoes, draughts and other games in moulded plastics.
Selcol Products, Ltd.	N.140	Nursery toys, rattles, musical toys, telephone indices.
Todd, D. G., and Co. Ltd.	N.6	Dolls, educational toys, mouth organs.
Toy Importers, Ltd. (Timpo Toys)	N.135	Cars, animals, buildings.
Velleman, D. H., and Co.	N.11	Educational toys, picture bricks.
Vogue Manufacturing Co. Ltd., The	N.136	Toys, toilet ware and fancy goods, advertising novelties, buckles.
Ward, B. J., Ltd.	N.93	Educational and novelty toys.
Woggle Sales, Ltd.	N.42	"Woggle" walking toys, incorporating p.v.c. and rubber.
Yudt and Yudt	N.139	Dolls, toys, Christmas crackers.

Products and Machinery at Castle Bromwich

IT is by a visit to the engineering, electrical, building and hardware sections of the British Industries Fair at Castle Bromwich that one becomes fully conscious of the future of plastics in industry, and of the way in which engineering skill is contributing to the production of semi-finished and finished goods of better and more exacting quality.

We make brief reference here to some of the plastics products and end-uses which will be of exceptional interest to the visitor to Castle Bromwich; there will be more to say, in retrospect, by the time our June issue is published. Our immediate interest, however, is centred upon the range of British-made plastics machinery which is now obtainable. Mouldings, by compression, are now possible to a weight of over 30 lb.; the injection moulding range has been much increased; laminating presses meet the uttermost requirements of the user as regards platen area and applied pressure; extrusion machines are capable of making products far more complicated than mere rod and tube and straight section, and multi-colour as well.

Into the design of all this machinery, not omitting to mention the heated platen and the moulding tools, there has been put a considerable amount of careful thinking and inventiveness; indeed, so much so, that plastics machinery is now no longer entirely of interest to those wholly concerned with the production of plastics products, but also attracts members of the engineering profession, who find something to learn or who seek an opening for improved mechanical movement and new devices.

Summary of Plastics Machinery at Castle Bromwich, Birmingham.

Exhibitor	Stand No.	Moulding Presses (including transfer moulding)	Injection Moulding Machines	Extrusion Machines	Preforming Machines	Hobbing Presses	Moulds	Die-sinking Machines	Steels for Moulds	Calenders	Welding and Preheating (electrical, including H.F. source)	Hot Gas Welding	Pulverizing Machinery	Granulating and Pelleting Machinery	Magnetic Separation	Timing and Temperature Controls	Electronic Devices	Polishing Machines	Marking Machines
Allen, Edgar, & Co., Ltd.	D534	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—
Applied High Frequency, Ltd.	D416	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—
B.I.P. Engineering Ltd.	C307	X	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—
B.I.P. Tools, Ltd.	C327	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
Barlow-Whitney Ltd.	C210	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—
Blanding Machine Co. Ltd.	C605	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—
Bradley and Turton Ltd.	D239	X	—	X	—	X	X	—	—	—	—	—	—	—	—	—	—	—	—
British Jeffrey-Diamond Ltd.	D526	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—
C & G. Gauges Ltd.	D135	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—
Carr, Richard, W. & Company Ltd.	D232	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—
Chemical Pipe and Vessel Co. Ltd.	D537	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—
Christy and Norris Ltd.	D403	—	—	—	—	—	—	—	—	—	—	—	X	—	X	—	—	—	—
Cohen, George, Sons and Co. Ltd.	Outdoor Stand	X	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—
Daniels, T. H. and J. Ltd.	D310	X	—	X	X	X	X	—	—	X	—	—	—	—	—	X	—	—	—
Dohm Ltd.	B211	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
E.M.B. Co. Ltd	D238	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Edwards, F. J. Ltd.	D411	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—
Elliott Bros. (London) Ltd.	C320	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—
English Steel Corporation Ltd.	D541/438	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—
Ether Ltd.	C700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—
Fielding and Platt Ltd.	D132	X	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—
Ferranti Ltd.	C615/514	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	X	—	—
Finney Presses Ltd.	D243	X	—	—	—	X	X	—	—	—	—	—	—	—	—	—	—	—	—
Firth Brown Tools Ltd.	D627	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—
Foster Instrument Co. Ltd.	C727	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	X	—	—
Foster, Yates and Thom Ltd.	D504	X	—	X	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—
Funditor Ltd.	D330	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X
G.W.B. Electric Furnaces, Ltd.	C321/220	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—
General Electric Co. Ltd.	C503/402	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—
Herbert, Alfred Ltd.	D310	X	X	—	—	X	X	X	—	—	X	—	X	—	—	X	—	—	—
Hopkins, E. C. Ltd.	D741	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—
Hupfield Bros. Ltd.	D724	—	X	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—
Londex Ltd.	C724	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—
Mills, John and Co. (Llanidloes) Ltd.	D335	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Neill, James and Co. (Sheffield) Ltd.	D341	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—
Neil and Spencer Ltd.	D641	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—
North British Rubber Co. Ltd.	D138	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
P.A.M. Ltd.	C416	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—
Projectile and Engineering Co. Ltd.	D209	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Radio Heaters Ltd.	C219	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—
Resinoid and Mica Products Ltd.	C416	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
Rockweld Ltd.	D537	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—
Trist, Ronald and Co. Ltd.	D539	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
Turner Brothers (Birmingham) Ltd.	D512	X	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
Turton Bros. and Mathews Ltd.	D413	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—
Technical Machines and Accessories Ltd.	C227/104	—	—	—	—	—	X	X	—	—	—	—	—	—	—	—	—	—	—
Ward, Thos., W.	D719	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Wild-Barfield Electric Furnaces Ltd.	C321/220	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—
Windsor, R. H. Ltd.	C227/104	—	X	X	—	—	X	X	—	—	—	—	—	—	—	—	—	—	—

Plastics Exhibits (excluding machinery) at Castle Bromwich, Birmingham

Exhibitor	Stand No.	Moulding powders	Laminates	Extrusions	Bonding Materials	Mouldings and other end uses: Electrical industry	Radio and television	Engineering components and tools	Textile machinery	Motor car parts	Aircraft/ shipbuilding	Building materials, including flooring	Sanitary fittings	Builders' hardware	Furniture	Tank linings and chemical plant	Protective coatings/ packaging	Foundry core bonding
B.B. Chemical Co., Ltd.	D.108	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—
Bakelite Ltd.	C.404	X	X	—	X	X	—	X	X	X	X	X	—	X	X	—	—	—
Beetle Bond Ltd.	B.402	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	X
Birkbys Ltd.	C.417	X	—	—	X	X	—	X	X	X	X	—	X	—	—	—	—	—
Bowker, S. O., Ltd.	C.705	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
British Celanese Ltd.	A.327	X	—	X	—	—	—	—	—	X	—	X	—	X	—	—	X	—
British Insulated Callender's Cables Ltd.	C.314	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
British Moulded Plastics Ltd.	C.612	—	—	—	—	X	X	X	—	X	—	—	X	—	X	—	—	—
Cellon Ltd.	B.537	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—
Chemical Pipe and Vessel Co. Ltd.	D.537	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—
Clang Ltd.	C.215	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
Cole, E. K., Ltd., Plastics Division	C.403	—	—	—	—	X	X	—	—	—	—	—	X	—	X	—	—	—
Croda Ltd.	D.122	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—
Davis and Timm ns Ltd.	C.309	Inserts for plastics mouldings				—	—	—	—	—	—	X	—	—	—	—	—	—
De La Rue Floors and Furnishings	D.612	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
De La Rue Extrusions Ltd.	D.612	—	—	X	—	—	—	—	—	X	—	X	—	—	X	—	—	—
De La Rue, Thomas, and Co. Ltd., Plastics Division	D.612	—	X	X	—	X	X	—	—	—	X	X	—	—	X	—	—	—
Dohm Ltd.	B.211	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—
Empire Rubber Co.	D.700	—	—	X	—	—	—	—	—	—	—	X	—	—	—	—	—	—
Evered and Co. Ltd.	B.309	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—
	B.327																	
Fibreglass Ltd.	B.200	—	X	—	—	X	—	X	—	—	—	—	—	—	—	—	—	—
FitzGibbon and Murray, Ltd.	C.105	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
Hall and Hall Ltd.	D.729	—	—	X	—	X	—	—	—	—	X	—	—	—	—	—	—	—
Holoplast Ltd.	B.315	—	X	—	—	—	—	—	—	—	X	X	—	—	X	—	—	—
I.C.I. Ltd., Plastics Division	D.107	X	—	—	—	X	—	—	—	—	—	X	X	—	—	X	X	—
Ioco Ltd.	D.701	—	X	—	X	X	—	X	—	—	—	X	—	—	—	—	—	—
Jicwood Ltd.	D.726	—	X	—	—	—	—	—	—	—	—	X	—	—	—	—	—	—
Lacrinoid Products Ltd.	A.623	—	—	—	—	X	X	X	—	—	X	—	X	X	X	—	—	—
Langley, London, Ltd.	C.226	—	X	—	—	X	X	—	—	—	—	—	—	—	—	—	—	—
McArd, Robert, and Co. Ltd.	B.619	—	—	—	—	—	—	X	X	—	—	—	X	—	—	—	—	—
Metway Electrical Industries Ltd.	C.225	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
Moulded Products Ltd.	C.612	—	—	—	—	X	X	X	X	—	—	—	X	—	—	—	—	—
North British Rubber Co. Ltd.	D.138	—	—	X	—	—	—	—	—	—	—	X	—	—	—	—	—	—
Resinoid and Mica Products Ltd.	C.416	—	X	—	—	X	—	X	—	—	X	—	—	—	—	—	—	—
Rockweld, Ltd.	D.537	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—
Schori Metallising Process Ltd.	D.524	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	X	—
Shires and Co. (London) Ltd.	B.622	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—	—
Streetly Manufacturing Co., Ltd.	C.307	—	—	—	—	X	X	—	—	—	—	—	X	X	—	—	—	—
Tanks and Linings Ltd.	D.747	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—
Telegraph Construction and Maintenance Co. Ltd.	C.413	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—
Temple Press Ltd.	C.714	Publishers of "Plastics"				—	—	—	—	—	—	—	—	—	—	—	—	—
Thor Hammer Co.	A.642	—	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—
Trist, Ronald, and Co. Ltd.	D.539	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—

Plastics Materials, Mouldings and Extrusions

Robert McArd and Co., Ltd. (B619)

This company produces plastic lavatory seats in black and all colours to harmonize with existing sanitary ware. They also produce mouldings to customers' requirements, and include examples of textile and general engineering moulded components among other exhibits.

Bakelite, Ltd. (C404)

The main feature shown by Bakelite, Ltd., will be their Plastics Travelling Exhibition. This has already been seen in Brussels, Oslo, Stockholm and London. The exhibit is arranged in series of self-contained units, designed to emphasize the outstanding properties of "Bakelite" synthetic resins and adhesives, phenolic and urea moulding materials, laminated sheet, rod and tube, "Vybak" extrusion and calendering compounds and pressed polished sheet, and "Warerite" decorative laminated plastics for wall and furniture surfaces.

Beetle Bond, Ltd. (B402).

This company is showing two specific applications for "Beetle" resins, namely, adhesives for the plywood and woodworking industries, and resin W.20 as used for bonding foundry sand cores. "Beetle" adhesives are featured in a striking exhibit designed to demonstrate the strength of joints made with these materials.

Birkbys, Ltd. (C417)

On this stand will be seen a complete range of their "Elo" plastic products, including mouldings and moulding powders; resins, solid, powdered or in solution; insulating varnishes; and anti-friction resins.

British Celanese, Ltd. (A327/226)

"Celastoid" for covering wood and metal tube and rod, for use in the building trade and for furniture, and "Clarifoil" vision packaging for machine tools and engineering components provide part of the exhibit of this company on the "Derby for Industry" stand.

British Insulated Callender's Cables, Ltd. (C314)

Noteworthy among the special-purpose electric cables to be seen on this stand is the multicore television camera cable for use with the latest television outside broadcast equipment. This polythene insulated cable, which is one of a wide range of low-loss cables, is unique in that it is capable of handling video signals with low attenuation, scan currents, speech inter-communication, power supply, cue light circuits, etc., in a robust but flexible sheath of only 0.95-in. diameter.

The new "Bicalex" wires are insulated with a synthetic enamel of the polyvinyl acetal type—a covering which combines the high space factor and excellent dielectric properties of oil-base enamel with outstanding physical characteristics.

British Moulded Plastics, Ltd. (C612)

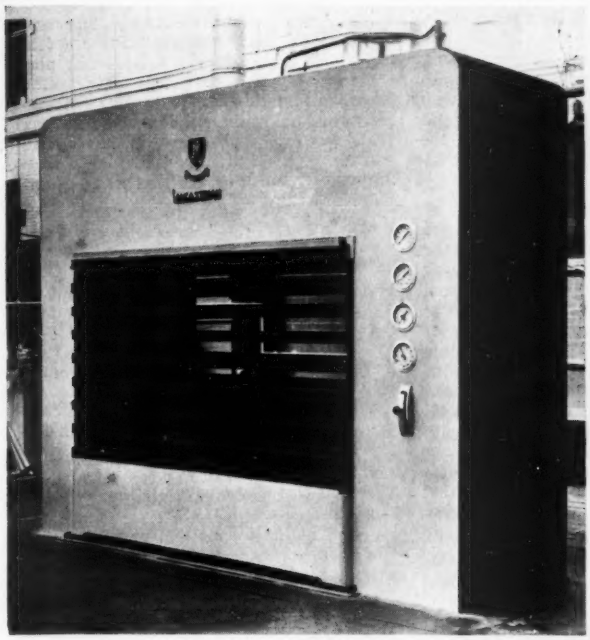
This company is exhibiting jointly with Moulded Products, Ltd. (which see).

Chemical Pipe and Vessel Co., Ltd. (D537)

On this stand can be seen valves, pipe fittings and pipe arrangements fabricated by the hot gas welding of polythene; also tank linings in polythene and rigid p.v.c.

E. K. Cole, Ltd. (C403)

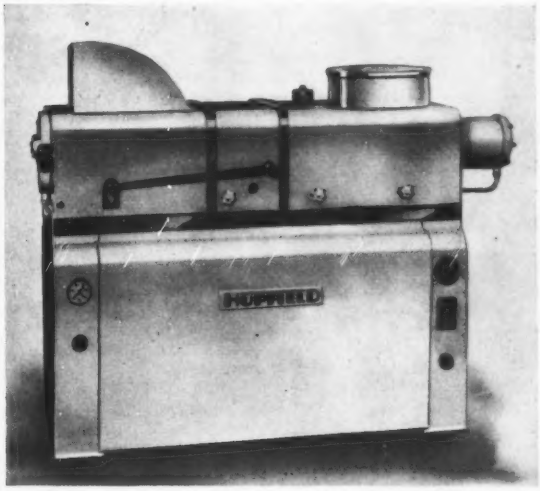
Typical plastics mouldings for the electrical industry, made by the Plastics



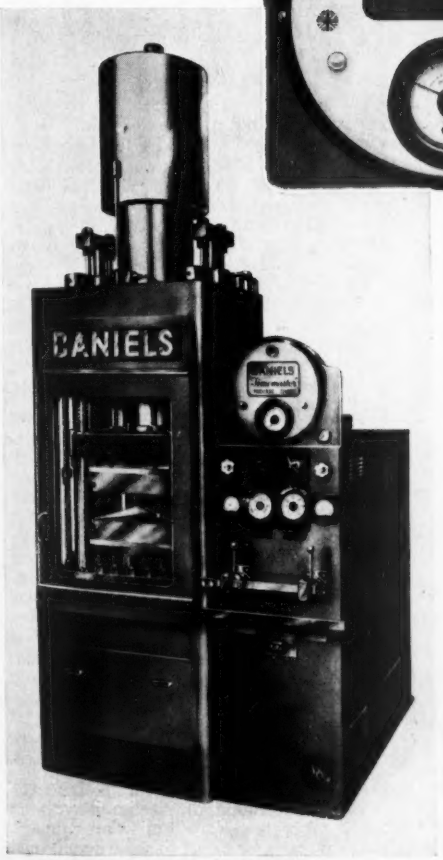
(Above) 1,000-ton "Lancastrian" synthetic board press. (Foster, Yates and Thom Ltd., Stand D.504.)

Induction heated platen, showing how coils are incorporated. (B.I.P. Tools Ltd., Stand C.327.)

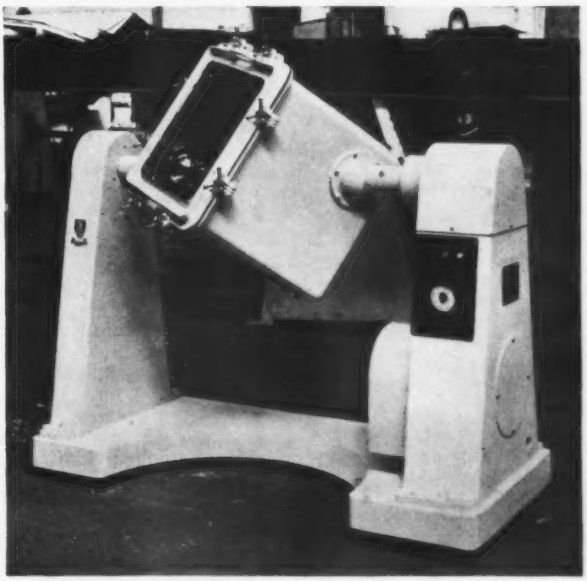
(Left) New 75-ton transfer press by T. H. and J. Daniels Ltd., fitted with (inset above) Daniels "Time-master" (Alfred Herbert Ltd., Stand D.310.)



Injection moulding machine (1-oz) incorporating new features. (Hupfield Bros. Ltd., Stand D.724.)



(Right) Transportable mixing machine of new design. (Foster, Yates and Thom Ltd., Stand D.504.)



Division of this concern, are being shown at Castle Bromwich, but the company is also represented on the British Plastics Federation stand in the Plastics Section of the Fair at Earls Court.

Evered and Co., Ltd. (B309/327)
This company are well known for moulded plastics hardware for builders' and cabinet-makers' use. As on previous occasions, they also display a range of mouldings for other trades.

General Electric Co., Ltd. (C503/402)
This exhibit includes equipment for airport and street lighting. Street lanterns include the "Three-Eighty" refractor lantern, in which a special method of fixing the four "Perspex" refractor plates to the trough provides an hermetic seal without a visible joint. Primarily for side street lighting is the new G.E.C. post top mounting lantern on a 3-in. by 3-in. spigot, which is totally enclosed in reeded "Perspex" of a conical form, and has a pressing of diffusing opal "Perspex" to allow light to fall immediately underneath the lantern.

Holoplast Ltd. (B315)
This year, for the first time, Holoplast, Ltd., are exhibiting in the Building Section of the Fair at Castle Bromwich. They show "Holoplast" laminated structural plastic panels and linings; also the latest addition to their range of production, "Corroplast," which is the registered trade name for a corrugated roofing sheet manufactured from the same raw materials as their other "Holoplast" products.

Imperial Chemical Industries, Ltd. (Plastics Division) (D107)
The I.C.I. stand at Castle Bromwich is of special interest to the engineering trades. Examples are shown of engineering components moulded in nylon, polytetrafluoroethylene gland packings, and "Alkathene" in various forms—including the new "Alkathene" foil for use as an anti-corrosion membrane for floors, and "Alkathene" film for the protective packaging of tools and precision instruments.

Ioco, Ltd. (D701)
"Formapex" synthetic resin bonded laminates in sheet and tube forms, in paper bases for electrical insulation purposes and in fabric base for electrical and mechanical applications, including silent gears, heavy-duty bearings, pump rings and impeller blades are to be seen at this stand. There is also a high-grade laminate ("Artoco") for use as wallboard, counter and table tops; and "Silopex" woven glass fabric impregnated with silicone varnish for electrical insulation where resistance to temperatures in excess of 200 degrees C. is required. "Zapide" vinyl-coated fabrics are another Ioco exhibit.

Lacrinoid Products, Ltd. (A623)
True-to-life imitation "wood carvings" for use as motifs in the decoration of furniture, and also architecturally, are among the plastics productions exhibited here.

The use of resin syrups for the production of ornamental objects by casting in flexible moulds has hitherto been confined in this country to the manufacture of cameo-brooches and the like. Flexible moulds made of "Vinamold" hot melt compounds or of "Welvic" p.v.c. paste, however, render possible the casting of objects having deep undercuts, as in the case of these "wood carvings."

The difficulties of producing moulds from an original wood surface, due to porosity and moisture content, have been successfully overcome. With no tool charges involved, and a low capital outlay on equipment, prices are well below those of the hand-carved product and are competitive with compression mouldings. The depth and intricacy of pattern are limited only by the skill of the wood-carver.

Moulded Products, Ltd. (C612)
This concern have a number of exhibits of general interest. It is well-known that the high cost of tooling has, in the past, made the manufacture of small quantities of plastic mouldings uneconomical, but a new process, recently perfected by this company, permits the production of relatively small quantities at very reduced tooling costs. By the same process, a plastic coating in black or colour can be applied to a wide variety of manufactured articles, giving durability, good appearance, and kindliness of "feel"—again at very moderate cost for tools.

Another notable development—the result of co-operation between Moulded Products, Ltd., and one of the leading switchgear manufacturers—is the introduction of colour in domestic switchgear.

Resinoid and Mica Products, Ltd. (C416)
Injection and compression mouldings, "Micanite" and "Bakelite" insulating tubes and moulded parts, and machined components in phenolic sheet and rod are exhibited.

Thomas De La Rue and Co., Ltd., and Associated Companies (D612)
"Delaron" and "Traffolyte" engraving and interlaminate printed materials are shown, together with a number of examples of the uses of the former in constructional and electrical work. Included are odourless "Delaron" for use in refrigerators, food storage cabinets and similar applications, and the white ant and termite resistant grades for the tropics.

Their associated company, De La Rue Extrusions, Ltd., are showing extrusions in cellulose acetate acetate-butyrate, polythene and p.v.c. De La Rue Floors and Furnishings, also on this stand, have a display of plastic floor tiles.

Schori Metallising Process, Ltd. (D524)
A demonstration of flame-sprayed polythene by the Schori powder process for protective and decorative purposes is to be seen at this stand.

Shires and Co. (London), Ltd. (B622)
Non-corroding and frost-resisting plastic lavatory cisterns and moulded lavatory seats provide the main display of this company.

Streetly Manufacturing Co., Ltd. (C307)
Exhibiting at Castle Bromwich, this well-known concern have four main display units which feature "case-histories" of the more intricate trade mouldings made on a mass-production scale. These are designed to stress Streetly versatility and technical skill.

A moulding press seen in operation on this stand demonstrates the making of a typical Streetly trade moulding.

Tanks and Linings, Ltd. (D747)
At this stand may be seen valves, ducting, pumps, etc., made chemically resistant by the use of unplasticized p.v.c.; also tank linings of p.v.c. and other materials.

Plastics Machinery

B.I.P. Engineering, Ltd. (C307)
The B.I.P. Group has hitherto comprised three main activities—chemical and materials manufacture, plastics mouldings and tool-making. To these manufacturing processes have now been added a fourth, i.e., plant engineering. This new undertaking, B.I.P. Engineering, Ltd., exists to make available to the moulding industry the benefit of several years work by the company's development engineers upon hydraulic press plant and, in particular, the automatic control of the moulding cycle.

B.I.P. Tools, Ltd. (C327)
An induction-heated tool is demonstrated here under working conditions. Great progress in the production of induction heated tools has been made since the introduction of this patented process last year. In addition to this demonstration, there will be a static exhibit of induction-heated platens and of induction coils.

Examples of cold hobbing and miscellaneous examples of precision-made mould parts will also be shown.

J. Bradley and Turton, Ltd. (D239)
This year Bradley and Turton are showing a new self-contained 150-ton press, embodying several interesting features; also two entirely new automatic control units coupled to a downstroking and an upstroking press respectively.

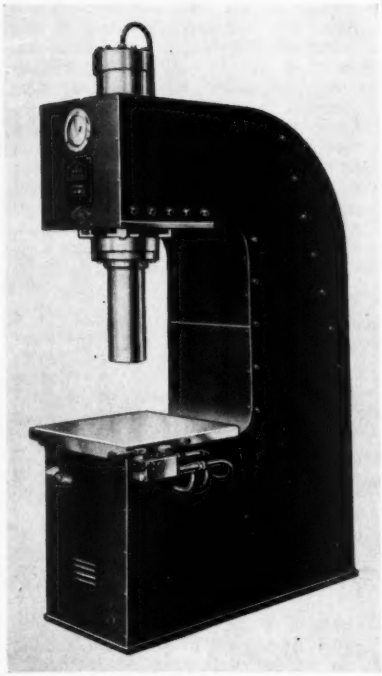
The new automatic control units mark a definite step forward in the control of hydraulic presses. The unit controls the cycle of operations on the press from the time the operator has put the powder into the mould and closed the guard until the press has opened again and the moulding is ready to extract. It operates screw-down type valves and can therefore be fitted to presses operating on an accumulator supply or as self-contained units. This unit has been developed jointly by Bradley and Turton, Ltd., and Arcolectric Switches, Ltd., East Molesey.

British Jeffrey-Diamond, Ltd. (D526)
Shown at the Fair for the first time this year is the "Midget Atomill" fine grinder, which is designed essentially for laboratory use, but robust enough for small-scale batch operation. It incorporates all the established features of the standard machine, with a high degree of accessibility to ensure quick and easy dismantling for cleaning either by brushing or washing.

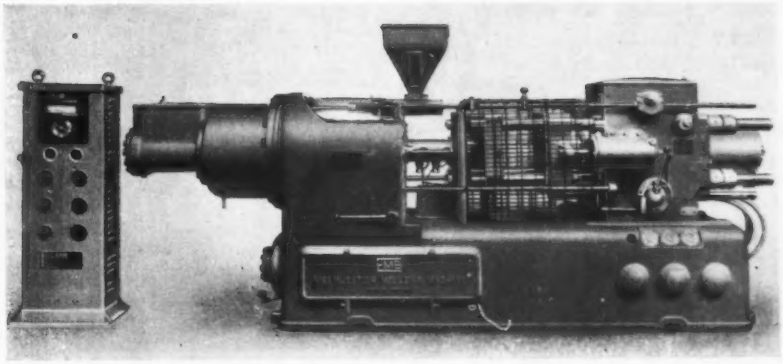
There is a machine in the company's range of breaking, crushing, pulverizing and grinding machines for friable materials to suit product requirements from 8-in. cube down to 300 mesh. Several of these machines can be adapted for shredding fibrous materials.

George Cohen, Sons and Co., Ltd. (Outdoor Stand)
Two hydraulic presses for plastics moulding are exhibited in operation. The 50-ton "Coborn" press is totally enclosed, self-contained and downstroking, with power adjustable from 50 tons to approximately 10 tons. The cycle time, excluding curing or loading period, is approximately 15 secs. The platens, which are electrically heated and thermostatically controlled, are 17 ins. by 16 ins.; daylight is 10½ ins. The 40-ton press has a maximum power of 40 tons adjustable down to 8 tons. Two of these presses can be mounted on a common base-plate for use as a dual unit, with one set of pumping equipment operating both presses. Each press, however, is separately controlled.

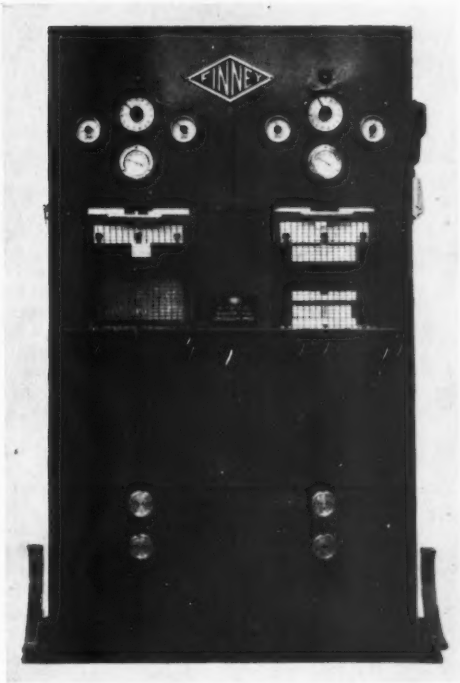
E.M.B. Co., Ltd. (D238)
The main exhibit of plastics interest on this stand is their No. 9B injection moulder, which is under air power to show operational



New 15/30-ton open-throat-type press. (Finney Presses Ltd., Stand D.243.)



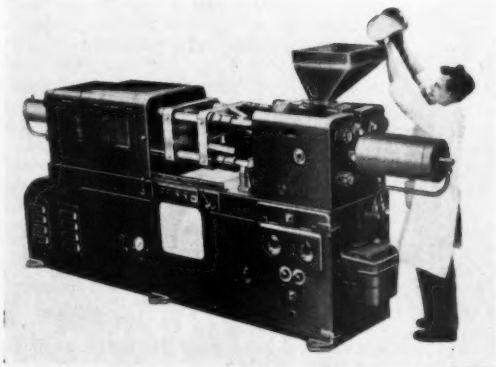
Injection moulding machine 9B, with temperature control pillar. (E.M.B. Co., Ltd., Stand D.238.)



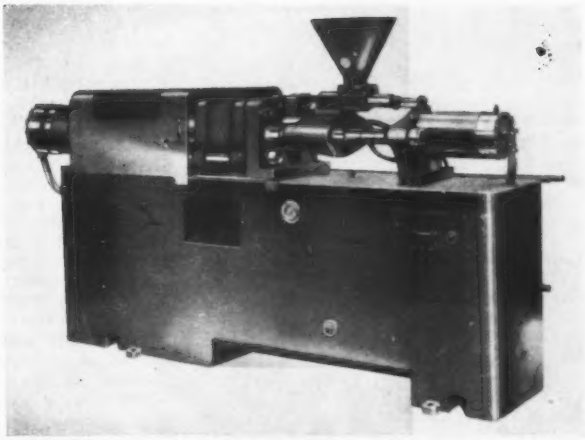
(Above) Finney 50-ton transfer moulding press, dual unit. (Finney Presses, Ltd., Stand D.243.)

(Above) High frequency generator for plastics heating. (Wild-Barfield Electric Furnaces, Ltd., Stand C.321.)

New "Midget Atomill" for laboratory use. (British Jeffrey-Diamond, Ltd., Stand D.526.)



S.H.4 controlled-cycle 4-oz. injection moulding machine. (R. H. Windsor, Ltd., Stand C.227/104.)



New 2-oz. injection moulding machine. (Projectile and Engineering Co., Ltd., Stand D.209.)

features, although not producing actual mouldings.

Finney Presses, Ltd. (D243)

Hydraulic presses, both automatic and hand-operated; steam and electric hotplates; hobbing presses; moulds; pelleting, finishing and polishing machines are being shown by this firm. Their exhibit will also include hydraulic pumps and control valves of all types, including the latest solenoid-operated valve.

The Finney 50-ton transfer-stroke compression-moulding press (dual) unit is totally enclosed and fully self-contained. It consists of two 50-ton up-stroking presses, with two pull-back rams for each press. Platens are "T" slotted for fixing top and bottom force of moulds, and suitable adjustable stripping gear is mounted with hangar bars at each side of each press. The plunger or transfer unit is mounted separately on the crosshead of each press. The pump unit is a standard P.6 two-stage, delivering 1.2 gallons per minute at 250 lb. per sq. in., and 12 gallons per minute at 2,240 lb. per sq. in.

The 15-ton open-throat type, down-stroking Finney press, introduced for arboring, assembly and straightening of light machine parts, is completely self-contained, with the pump unit enclosed in the press body.

Foster, Yates and Thom, Ltd. (D504)

The latest addition to the series of "Lancastrian" presses manufactured by this company is an 85-ton battery-box press, designed for single impression moulding of all composition battery boxes up to the six-compartment 11-plate element size, by the top trapping method.

Fully automatic operation is provided throughout, and when once the cycle is initiated, no further attention is required until the hydraulic ejector removes the completed box, and the guards open to indicate completion of the cycle. Heating and cooling of the mould is fully automatic, and is interlocked with the hydraulic movement. As exhibited, the press is designed for operation from an oil-hydraulic accumulator feeding a number of presses, but a self-contained model is available as an alternative.

Dry powder mixers, also to be seen on this stand, are claimed to be highly efficient machines which ensure accurate and consistent mixing without regard to the proportions, grain size or specific gravities of the ingredients. The mixing container is a cubic drum mounted diagonally on trunnions at a compound angle. It rotates quite slowly at between 7 and 14 r.p.m., according to the size of the machine, and the resulting mixing action resembles a "figure of eight" or interweaving motion. The combination of these factors completely eliminates "dead spots"; no complications arise through centrifugal forces and the mix is protected against harm arising from either attrition or pulverizing.

Sizes ranging from 10 lb. charging capacity up to 15 cwt. at S.G.I. are available.

Funditor, Ltd. (D330)

Machines and accessories for marking plastics and also machines for sawing plastics are exhibited on this stand. The Funditor "Sand-jet" marking machine produces its clear-cut mark by means of a short blast of fine grit material in conjunction with a rubber stencil or mask. Equipped with air filter and pressure reducing valve, this machine will operate on very low air pressures (normally 30-40 lb. per sq. in.) and may be connected with any existing air line giving 40 to 150 lb. air pressure. The electric timer can be set for any marking period from 0.5 to 10 secs.

Alfred Herbert, Ltd. (D310)

Plastics machinery made by T. H. and J. Daniels, Ltd., is being exhibited by Alfred Herbert, Ltd., who are sole agents for this machinery in Great Britain, India, France and Italy.

The Daniels 75-ton transfer press, a new self-contained plastic-moulding press of streamlined design, is operated by a vane-type pump which is integral with the base of the control panel. The press has a daylight of 16 ins. between the 18-in. square electrically heated platens. The main ram is 10 ins. diameter and a stroke of 14 ins. is available. The transfer unit has a 2½-in. diameter ram of the annulus type with a stroke of 4 ins. and a total transfer load of 12.5 tons.

The transfer moulding cycle on this press is controlled automatically by means of the Daniels "Timemaster" cycle controller. This accurate controller is very robust. Once it has been "set," the moulding cycle, including one or two "breathes," is accurately repeated to ensure perfect mouldings.

The Daniels 2B preforming machine for preforming tablets up to 1⅛ ins. diameter by ¾ in. deep is also exhibited. This machine deals with normal grades of phenolic and urea moulding powders and those grades which require a higher pressure and which are difficult to feed. Its main features are easy external adjustment and a wide speed variation from 20 to 60 strokes per minute, a tablet counter, interlocked safety guards, dust extraction and enclosure of all working parts. The machine is in operation, preforming tablets for the Daniels press already mentioned.

The "Edgwick" type HY injection machine, here shown in operation, is engaged in moulding nylon, a material which is extremely difficult to mould without bleeding from the heating cylinder. The heating cylinder has been specially designed by T. H. and J. Daniels, Ltd., with a torpedo to spread the plasticizing material to the outer walls and thus ensure a rapid, uniform heating.

Hupfield Brothers, Ltd. (D724)

A number of new features have been incorporated in the 1-oz. injection moulding machine shown by this firm, which was originally described in "Plastics," 1948/April/193. The machine is now much faster, and operation is by one handle only. A hopper is also fitted, complete with a compensating feed mechanism. Closer temperature control is also possible. For the first time they will also be showing a 2-oz. capacity machine built on similar lines, and also a granulating machine for reclaiming scrap plastics material.

Londex, Ltd. (C724)

Process timers are one of the features to be seen here. The range of these timers is being continuously improved and enlarged to meet their many growing requirements. Such timers (see "Plastics," June, 1948, page 314) are especially suitable for the control of moulding presses and high-frequency heating equipment in the plastics industry.

Projectile and Engineering Co. Ltd. (D207)

On this stand is seen the new 2-oz. injection moulding machine which has extended the range of the H.L.2 series. These machines are hydraulically operated and self-contained, with all constructional features kept on the simplest lines. Injection pressures and rate of injection have been kept very high to ensure satisfactory mouldings where intricate shapes or sudden changes in wall section are required. The operational cycle is reduced to the minimum by the adjustable changing stroke which eliminates any idle movement. The plasticizing capacity of the 2-oz. machine is 18 lb. of cellulose acetate per hour; minimum time cycle of operation, 11 seconds.

Radio Heaters, Ltd. (C219)

This firm is making a special feature of their new large thermoplastic sheet press welder. With an output of 6 kW, this equipment has approximately three times the output of the largest equipments of its type so far produced in this country. It will enable large inflatable toys, drum liners, etc., to be produced in a single operation.

Technical Machines and Accessories, Ltd. (C227/104)

This concern supplies die-sinking machines for the plastics industry, one of which was recently described in "Plastics" (March, 1950, page 80).

Turner Brothers (Birmingham), Ltd. (D512)

On this stand will be pressings and die castings produced from press tools and moulds, and also a wide variety of plastic articles produced from moulds.

Wild-Barfield Electric Furnaces, Ltd. (C321/220)

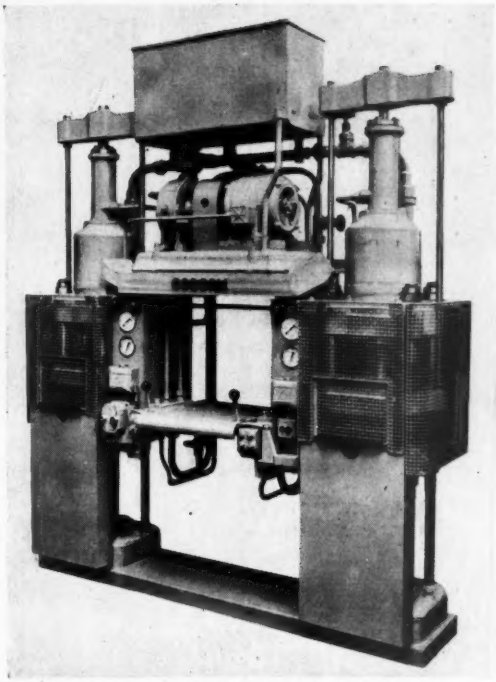
Radio frequency heating by means of a small transportable Ferranti-Wild-Barfield generator of high-frequency energy, as shown on this stand, is designed specially for the preheating of plastic material, preforms or powders. Particular attention has been paid to the simplicity of operation, and the safety of the operator. Instruments necessary for the efficient operation of the set have been reduced to a minimum, and safety interlocks incorporated to make sure that the high frequency is cut off when the lid is raised.

A toolroom tempering furnace is also shown here. By means of this equipment close temperature control is provided even at temperatures down to 200 degrees C. (424 degrees F.), and the most delicate and expensive dies, press tools, milling cutters, etc., may be treated without risk of damage.

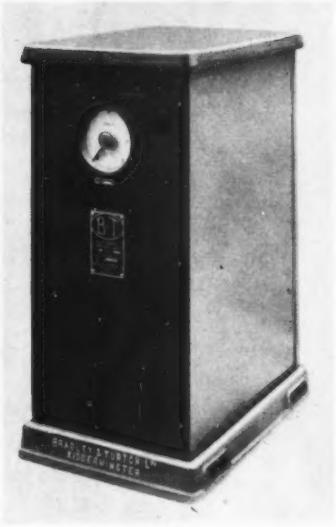
R. H. Windsor, Ltd. (C227/104)

Among plastics machinery exhibited on this stand is the S.H.4 automatic controlled cycle injection machine, which has been designed to provide a medium capacity machine, capable of producing articles weighing up to 4 oz. per shot, in a wide range of plastic materials. The automatic controlled cycle ensures correct timing of the moulding operations; hand control can be used if necessary for special purposes.

Also shown is the S.H.16/20 injection machine, which is capable of producing articles up to 20 oz. in a wide variety of materials. This machine, also automatic, incorporates the most up-to-date improvements and refinements. A special feature of this machine is the hydraulically operated retractable injection unit. A by-pass valve from the main circuit operates the two retracting cylinders by means of a single lever, to bring the nozzle against the sprue bush or away from the mould for sprue clearance or changing of material cylinders.

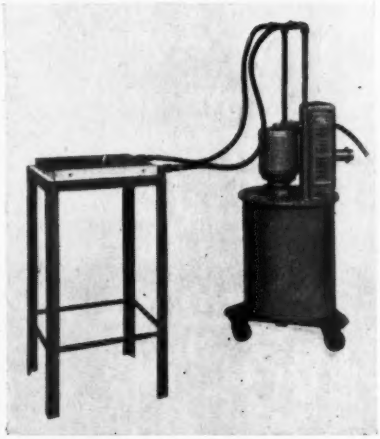


New 40-ton "Coborn" press for plastics moulding, dual unit. (George Cohen, Sons and Co. Ltd., Outdoor Stand.)

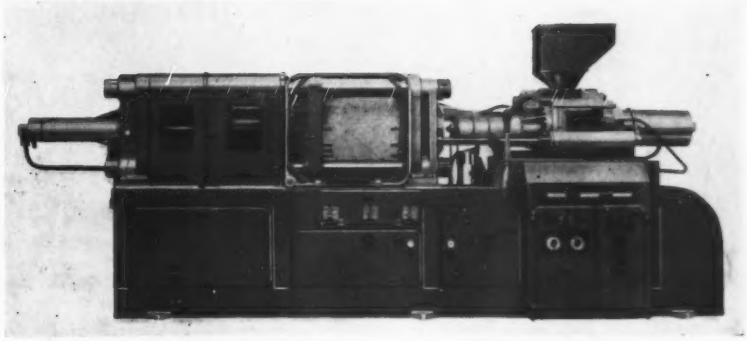


New automatic unit to control cycle of operations on moulding presses. (Bradley and Turton Ltd., Stand D.239.)

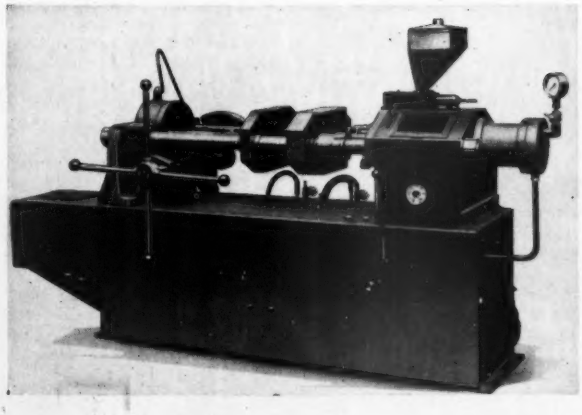
"Sandjet" marking machine for plastics. (Funditor Ltd., Stand D.330.)



Self-contained heat circulating unit for platens. (Finney Presses Ltd., Stand D.243.)



(Above) S.H. 16/20 injection moulding machine producing articles up to 20 oz. (R. H. Windsor Ltd., Stand C.227/104.)



(Left) "Edgwick" type H.Y. injection moulding machine. (Alfred Herbert Ltd., Stand D.310.)

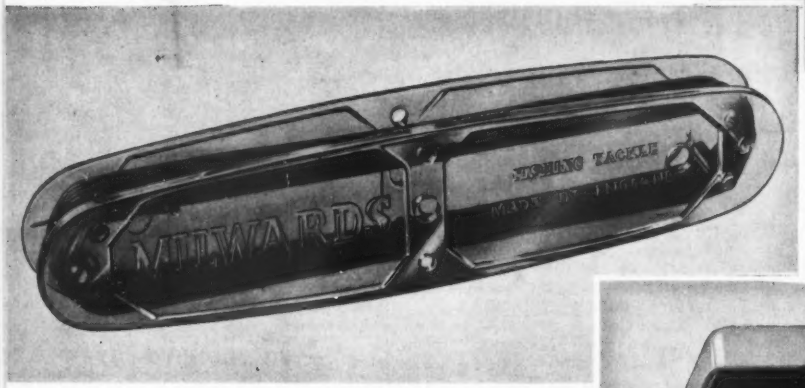
(Right) "Radyne" thermoplastic sheet welder. (Radio Heaters Ltd., Stand C.219.)

PLASTICS
IN THE SERVICE OF MAN

A pictorial review of high-quality units moulded or otherwise fabricated in Great Britain . . .

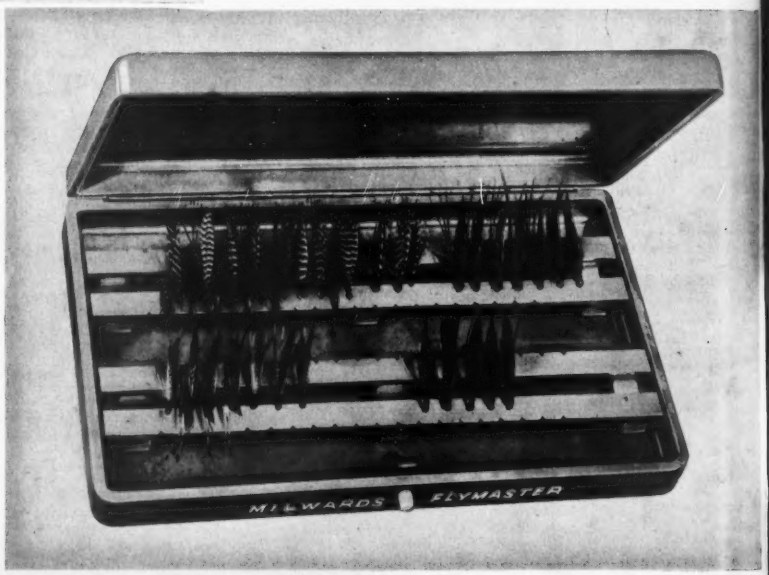
10. Sports Goods

(Above) The "Elo" fishing reel is moulded in red phenolic moulding powder by Birkbys, Ltd.

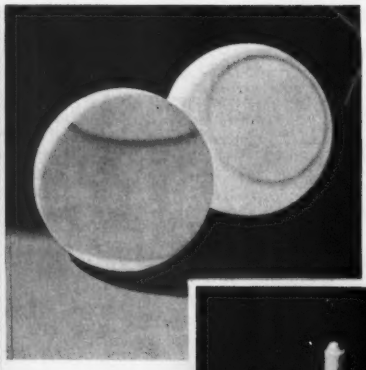


(Above) This fishing line of "Terylene" polyester yarn, wound on a transparent plastic spool, is manufactured by Milwards Fishing Tackle, Ltd.

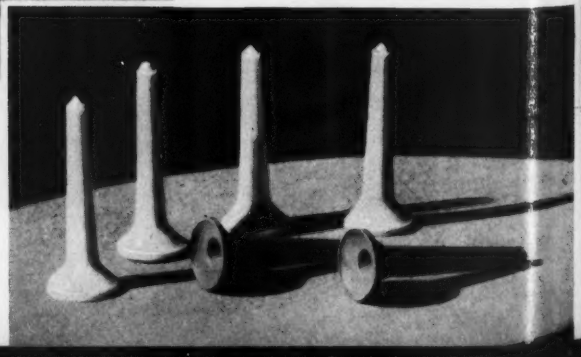
(Right) Magnetic fly box in which the outer box is of plastic. This is another product of Milwards Fishing Tackle, Ltd.



(Below) The "Litesome" cricket guard, moulded in cellulose acetate by Byson Appliance Co., Ltd., for Fred Hurtley, Ltd., combines great strength with light weight.

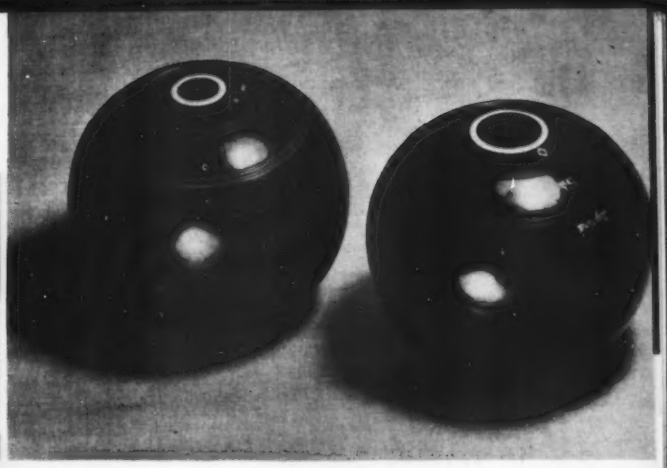


(Left) The new Halex "Meteor" celluloid table-tennis ball is made in three sections with two seams. This gives more even distribution of weight and prevents seams from being struck at right-angles.



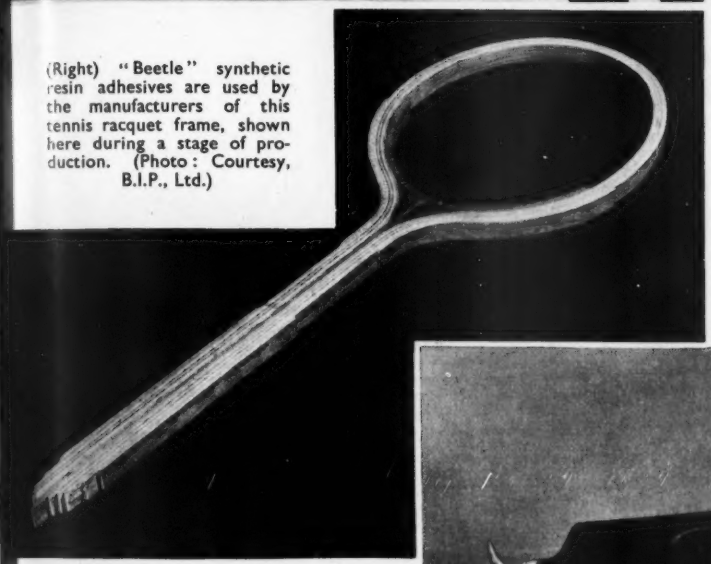
(Right) These brightly coloured injection-moulded golf tees, in cellulose acetate, are moulded by Fraser and Glass, Ltd.

(Below) "Tufnol" paper and fabric base phenolics and laminates made by Tufnol, Ltd., are ideal materials for plugs, cleats, bearings, etc., for use on boats and yachts.

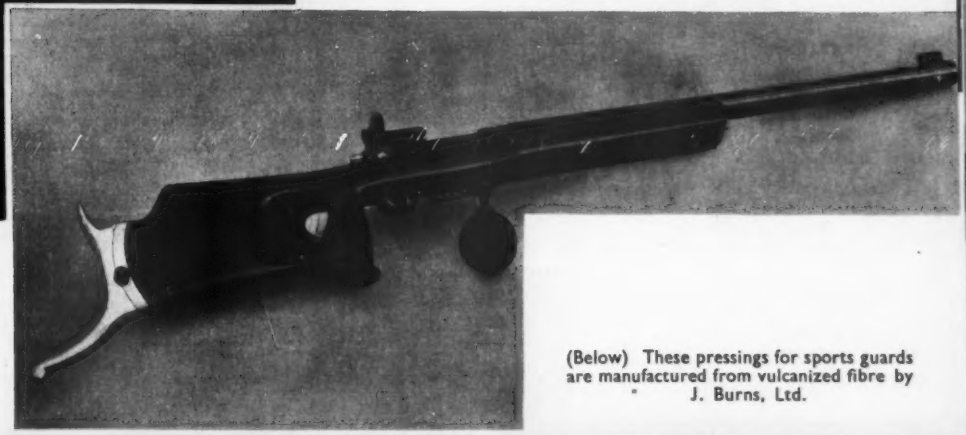


(Above) These bowls are moulded in phenolics by Moulded Products, Ltd., and machined and finished by Thomas Taylor of Glasgow.

(Right) "Beetle" synthetic resin adhesives are used by the manufacturers of this tennis racquet frame, shown here during a stage of production. (Photo: Courtesy, B.I.P., Ltd.)

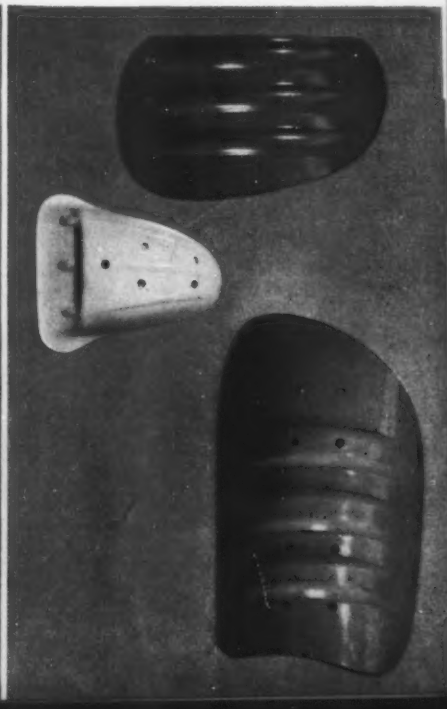


(Below) The laminated stock of this rifle, as used by the British Olympic shooting team, is made from many pieces of high-grade walnut bonded with "Beetle" adhesive. All the rifles for the British team were hand-made by Mr. John C. Knott, of Kingston, Surrey. (Photo: Courtesy, B.I.P., Ltd.)

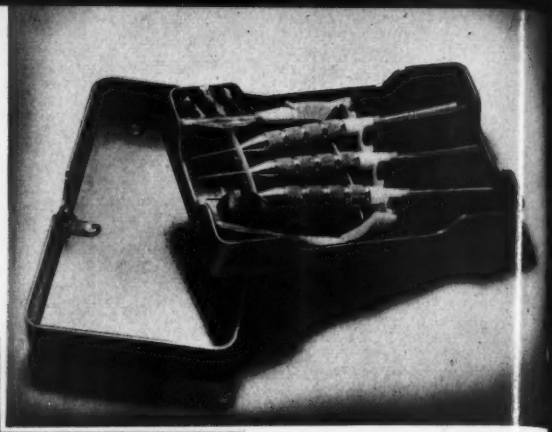


(Below) Water-resistant "Beetle" synthetic resin adhesives find many applications in the building of small craft such as that illustrated. (Photo: Courtesy, B.I.P., Ltd.)

(Below) These pressings for sports guards are manufactured from vulcanized fibre by J. Burns, Ltd.



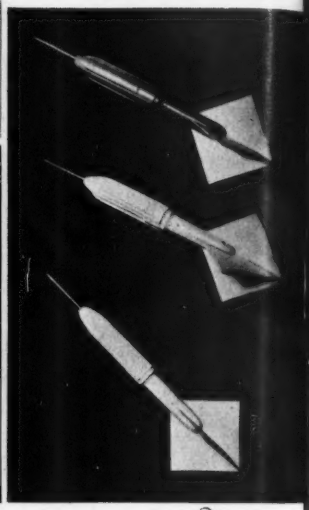
(Left and right) These two phenolic dart cases made by Unicorn Products, Ltd., are specially fitted to enable the darts to be carried safely. The box on the right makes use of an ingenious polythene clip to hold rigidly three complete darts and two spare (feather) flights.

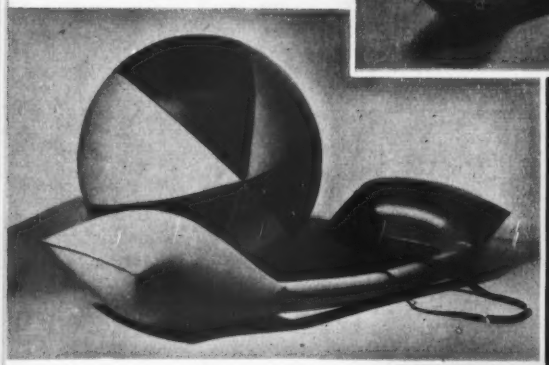


(Right) Dart flights of polythene, due to their lightness and indestructability, replace conventional feather flights. This group shows different designs evolved by Unicorn Products, Ltd.

(Below) Plysu Products, Ltd., manufacture the water wings and beach ball shown here from "Vybak" vinyl sheet. ("Plastics," 1947/Nov./607.)

(Below) The body of these darts, which first appeared in 1937, were moulded from cellulose acetate by British Xylonite Co., Ltd. ("Plastics," 1937/257.)





(Below) The plastic golf ball cleaner made by Hellerman Electric, Ltd., consists of a sponge in a moulded p.v.c. cup.

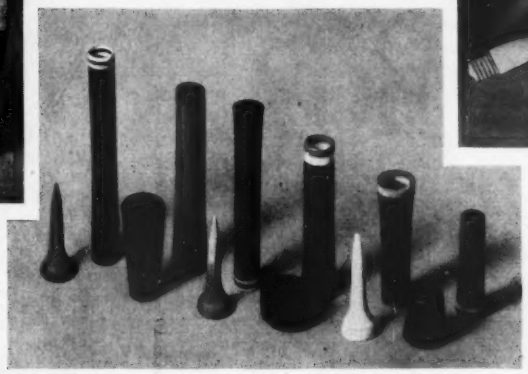
(Below) Extruded p.v.c. manufactured by De La Rue Extrusions, Ltd., is used for tennis court markings and also for knobbing on tennis and badminton rackets.

(Above) "Sutron" nylon monofilament, manufactured by Imperial Chemical Industries, Ltd. (Plastics Division), is replacing the conventional gut for stringing tennis rackets. (Photo: Courtesy I.C.I.)

(Left) "Jabroc" densified wood laminate, manufactured by Moulded Components (Jablo) Ltd., is the starting material for the manufacture of this golf club. Both the preform "blank" and the fully shaped club are shown here.

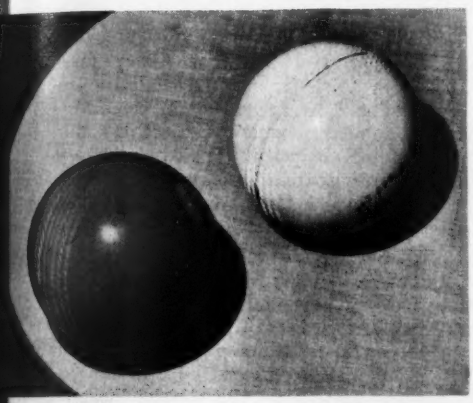
(Above) "Klokit" dart scorer, made by South Devon Patents, Ltd., is a pre-war production, moulded in a special "Bakelite" phenolic resin. ("Plastics," 1939/193.)

(Below) The Stationers' Division of Thomas De La Rue and Co., Ltd., manufacture the golf club ferrules and golf tees shown here.



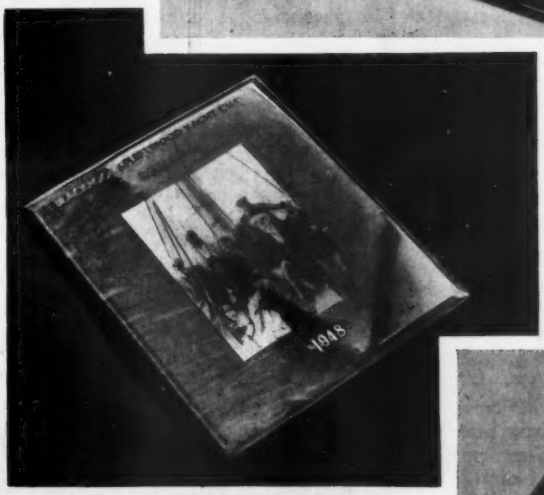
(Above) Dart flights in polythene and golf tees are products for the sports goods industry manufactured by British Moulded Plastics, Ltd.

(Above) Another "sports aid," first brought out before the war, is the Taylor-Rolph "Selfwynd" bowls measure, moulded by Crystalate, Ltd. ("Plastics," 1939/285.)



(Above) P.v.c. replaces leather for the outer skin of the cricket ball and hockey ball, made by Wallington, Weston and Co., Ltd. The ball, distributed by British Indoor Pastimes, Ltd., has been named the Compton-Edrich ball, as these famous cricketers have given approval after thorough tests.

(Below) The Riley billiards pocket, moulded in ebonite by United Ebonite and Lorival, Ltd., was described last month. ("Plastics," 1950/April/109.)



(Left) This photograph, embedded in acrylic sheet, manufactured by Oralite, Ltd., has interesting possibilities as a prototype of sports trophies and souvenirs.

(Below) The p.v.c. dartboard, manufactured by Wallington, Weston and Co., Ltd., has had an excellent reception by darts players throughout the country.

(Below) "Luron" fishing lines are made from clear and "mist green" nylon monofilament, product of Imperial Chemical Industries Ltd. (Plastics Division).

World's Industry Employs Plastics

GENERAL ENGINEERING

Fiberglass - polyester resin laminates.—D. Rosato surveys the fabricating technique and gives specific instructions on mixing resins, impregnating fabrics, protecting assembled fabrics, curing and finishing laminates. (U.S. Naval Air Material Center, Aeronautical Materials Lab., Philadelphia, Pa. Mar., 1948, PB99157)

Plastic surface on tempered presdwood.—A tough, stainproof plastic surface, comparable to that of laminate, is bonded to ⅛-in. Masonite tempered presdwood. "Lamidall" (produced by Woodall Industries, Inc., 2025, S. Calumet Avenue, Chicago, 16, T11) is said to combine the wearability of a tough plastic surface, the structural quality of presdwood and a distinctive pattern. ("Materials and Methods," 1949/Nov./104.)

Properties of laminated plastics at high and low temperatures.—J. J. Lamb, I. Boswell and B. M. Axilrod investigated tensile and compressive properties of several types of plastic laminates for aircraft structures at −70, +77 and +200 degrees F. Tensile and compressive strengths increased at the low temperature and decreased at the high temperature. (N.A.C.A. Tech. Note 1,550, 1948, July, and Journ. Research Nat. Bur. Stand, 1949/Sep./257, R.P.2028.)

CHEMICAL

Propionaldehyde is now available in commercial quantities. Besides its use in making resins, it is important in the manufacture of raw materials for alkyd resins, plasticizers and cellulose esters. ("Chemical Age," London, 1950/Jan. 14/63.)

Rubber-like plastic materials produced by Organic Coatings Div., United Chromium Inc., 51 E. 42nd Street, New York 17, N.Y., possess chemical properties lacking in natural and synthetic rubbers. They show excellent resistance to mechanical abuse such as abrasion. The paste-like material can be moulded or applied as coatings to metal, fabric or paper by dipping, spraying or brushing. ("Products Finishing," 1949/Oct./97.)

Studies on fluid phenol-formaldehyde resins.—K. H. Hauck tried to imitate conditions for the technical production in simple laboratory arrangements, and to test in this way the many variations in production. The laboratory tests could be reproduced and later on developed to large-scale processes. This gives some justification for applying this method for clarifying the chemistry and technology of phenolics. ("Kunststoffe," 1949/Oct./237.)

Resinous wood adhesives.—R. P. Hopkins and H. Grinsfelder (ASME Wood Industries Division Meeting Paper No. 49-WDI-4) state that ureas continue to be by far the largest selling resinous wood adhesives. They are used both in powdered and liquid forms; of the first, dustless types have been made. Catalyst incorporated resins have been made. More stable syrups are attempted. The usefulness of synthetic nitrogen adhesives has been extended by melamine modified ureas for hot-pressed plywood and furfuryl modified ones for more foolproof assembly gluing. Fast curing phenolics are used for hardwood. ("Mechanical Engineering," 1949/Nov./950.)

Fundamentals of adhesion.—According to G. M. Kline and F. W. Reinhart (ASME Wood Industries Division Meeting Paper No. 49-WDI-5), the most significant factor in adhesion is the molecular attraction operative between adherent and adhesive. Many physical factors affect strength of a bond. Types of chemical bonds are reviewed, and various physical factors affecting bond strength discussed. ("Mechanical Engineering," 1949/Nov./950.)

Progress in polymer production.—P. I. Smith gives a survey of new products and new developments during 1949 dealing with fluorinated plastics, alkyd resins, styrene-isobutylene plastics, polyvinyl carbazole, nylon, melamine resins and polyacrylonitrile fibres. ("Chemical Age," London, 1950/Jan. 14/59.)

Polyurethanes modified by castor oil have been prepared and evaluated. They show good elastomeric, electrical and physical properties. These, in general cross-linked products, are handled by casting. (PB99168, B. H. Carr, Jr., and W. Vasileff, Princeton University, Plastics Lab., 1949.)

Physical measurements during the polymerization of plastics.—R. Vieweg and W. Knappe in a report of the institute for technical physics of the technical high school, Darmstadt, determined the shrinkage, change in refractory index and specific electrical resistance on Hostacoll C of Farbwerke Hoechst. ("Kunststoffe," 1949/Nov./279.)

ELECTRICAL

Plastics in the electrotechnical industry. — J. C. Derksen and M. Stel give a survey on the many electrical uses of modern plastics, dealing first with the chemical composition, the various physical properties, with production techniques and some recent applications. ("Philips Technical Review," 1949/Aug./33.)

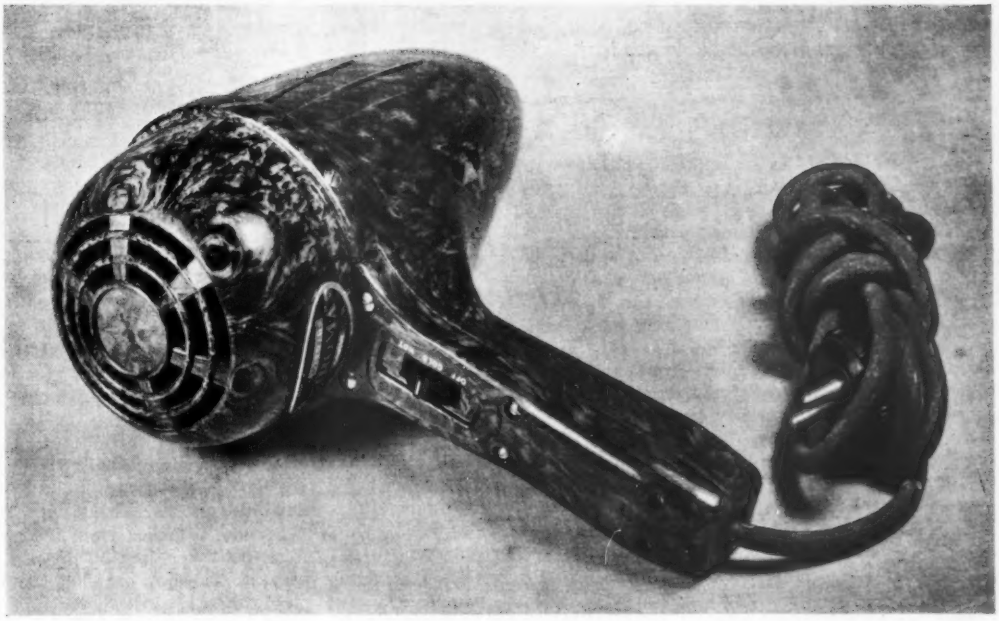
Polymerization synthesis.—E. K. Nielsen gives a literature survey on plastic materials for optical and electrical application. Development of materials which can be polymerized selectively in two stages to produce polymers with reduced shrinkage. Tests on a Schmidt lens are included. (Armour Research Foundation, Chicago, Ill., PB99163.)

Selective infra-red reflectance of plastics. — G. Rappaport describes a method of determining the characteristic infra-red frequencies of plastics by means of a spectral reflection method. (U.S. Air Material Command, Engineering Division, Materials Lab., Wright Field, Dayton, Ohio. July, 1948, PB99164.)

MISCELLANEOUS

Thermoplastics.—The Swiss Standards Institution has recently issued a specification for thermoplastics, dealing with definitions and properties. It is mentioned that the mechanical properties are dependent on the temperature and that the modulus of elasticity is very low in relation to metals, but can be varied between wide limits. It makes further reference to dielectric properties, and the resistance to humidity and against corrosion and solvents, the workability and ageing. (V.S.M. 77120, Aug., 1949.)

Vinyl plastic of improved heat resistance, developed by Chemicals Division of Glenn L. Martin Co., is a high-molecular-weight material with better heat and light stability than hitherto known vinyl plastics. Aircraft applications of "Marvinol VR-10" include electric wire and cable coverings and mechanical tubing; it is also useful for moulded toys, upholstery, decorative and packaging purposes. ("Materials and Methods," 1950/Jan./57.)



Moulded Housing for Hair-drier

OF all amenities in this present stage of civilization, the growth of the hair-drier has been one of the most startling, from both economic and technical points of view. The latter is seen more especially in the progress of design and in safety.

One of the very recent types put on the market is seen in the accompanying photographs, the housing of which was designed and manufactured by Metropolitan Plastics, Ltd., 17-20, Glenville Grove, London, S.E.8, for Siroma Engineering Co., Ltd., North Acton Road, London, N.W.10. Metropolitan Plastics, Ltd., inform us that in considering the design a number of problems arose; some of these were general and some were specific to this job.

(1) The appearance of the housing had to be attractive and in conformity with most modern trends.

(2) Strength was to be such that it would withstand rough treatment when assembled, bearing in mind the fact that the moulded housing would be carrying a relatively heavy inside.

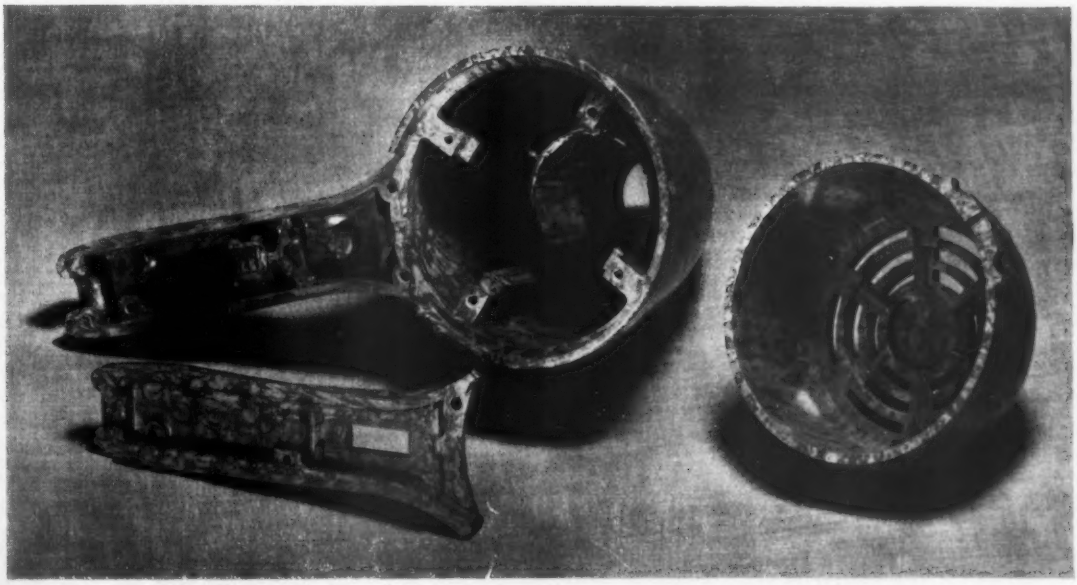
(3) Leakage of air had to be kept to a minimum.

(4) Production costs were to be reasonable.

(5) The housing was to conform to Government regulations all over the world.

(6) Its construction was to be such that assembly costs are reduced to a minimum.

A number of other minor features were incorporated once the main problems were overcome.



Three separate mouldings make up the complete housing for the "Siroma" hair-drier.

The design of the housing is considered to be one of the most attractive yet produced. It not only looks good, but is easily kept clean. Furthermore, the air intake is situated diametrically opposite to the hair of the user, and therefore the danger of loose strands of hair being caught in the fan is avoided.

The great strength of the housing lies in the moulding of the main body integrally with the handle. The driers have been subjected, experimentally, to rough and heavy treatment, and have successfully withstood all assaults. Where a similar housing in which the handle is moulded separately to the main body might show weakness, this housing shows its greatest strength. The design of the body also provides an internal tube, moulded as an integral part of the structure, its purpose being to receive the electric elements, to give added protection to the user, and to the housing itself. There are four internal ribs, which have the dual purpose of substantially adding to the strength of the structure and of acting as seatings for the comparatively heavy rotor which seats upon them.

The sealing against loss of air is an interesting feature of the design and conforms to the principle laid down by the poet Horace, that "its simplicity is elegant." In order to achieve this, it was essential that neither main body, cap or handle lid should show any signs of distortion after moulding; nor should they exceed the tolerances originally specified.

Three moulds were laid down to produce this housing—all multi-impression; one for the main body, one for the cap and one for the handle lid. The fit between the three parts can be kept accurate with single-impression moulds comparatively easily, but to do so with multi-impression tools is no small problem; however, no difficulty was experienced in actual production, and although many thousands have been produced, in no case did the fit not come up to the high standard demanded.

For ease of assembly, the housing incorporates 12 holes—seven of which are threaded and three countersunk, all with extreme accuracy of position.

The customer requested two types of housings, one in which he could incorporate a switch for either hot or cold air, and the other which would not incorporate a switch and would supply hot air only. This was effected by introducing inter-changeable pads in the handle-lid mould, whereby either type can be produced; thus saving the expense of an additional mould.

The electricity regulations of different countries to which these hair-driers are being exported were overcome by the method in which the air-intake slots were designed, and which not only conform to these regulations, but give an added beauty to the housing.

An interesting feature are the internal grips provided on the moulding for the flex. By this means the flex is gripped tightly by the moulding, and we would say that it was impossible for it to become detached from the switch. The assembled drier can actually be lifted by the flex and swung like a pendulum without the wires becoming detached from the switch.

The materials used are phenol-formaldehyde and urea-formaldehyde.

We beg to thank Metropolitan Plastics, Ltd., for the exceptionally full data given above.

LETTERS TO THE EDITOR

Correspondents are reminded that a stamped and addressed envelope should be enclosed in all cases where a personal answer is desired. It is understood that any letter received may be published at the discretion of the Editor.

Polyvinyl Butyral

Sir,—Our attention has been drawn to the article entitled "Thermoplastics for Temporary Mechanical Protection of Materials and Equipment," especially to the fact that polyvinyl butyral is believed to be the basic ingredient of the liquid-envelope type of medium.

This resin is marketed under the name of "Butvar," and in emulsion form can be sprayed, giving good adhesion to metal. Its characteristics are as follows:—

S.G. at 20 degrees C., 1.11; refractive index, 1.48-1.49; heat-distortion temperature, 61.5 degrees C.; tensile strength, 8,000-8,500 lb./sq. in.; flexural strength at 25 degrees C., 10,000-11,000 lb./sq. in.; shear strength, 14,000 lb./sq. in.

"Butvar" is soluble in methanol, ethanol, butanol, diacetone alcohol, methyl cellosolve, ethyl cellosolve and dioxane. Suitable plasticizers are dimethyl phthalate, diethyl phthalate, dibutyl phthalate, tricresyl phosphate, ricinoleates and sebacates.

Regarding its uses, "Butvar" is a good adhesive for mica bonding, plywood and "pressure sensitive tape." Highly plasticized S.G. "Butvar" forms the interlayer of one type of safety glass for vehicles. The resin is also used in transparent waterproof coatings for paper and textiles, for which purpose it has great durability. Compounded with phenolic resin, it provides a waterproof coating for rainwear garments. This resin, moreover, can be calendered and moulded.

Polyvinyl butyral is marketed under the name of "Butvar" by Shawinigan, Ltd., Marlow House, Lloyd's Avenue, London, E.C.3.

London. W.A.

Cigarette Cases

Sir,—In the July, 1949, issue of "Plastics" I saw a letter by an English firm inquiring for manufacturers of plastic cases for the American-type cigarettes. I would also be grateful for names and addresses.

WALTER E. DEY.

6, Willis Street,
Belmont, Port of Spain,
Trinidad, B.W.I.

Latex Rubber Moulds

Sir,—We are interested in contacting firms in various parts of the country who are able to make intricate latex/rubber moulds for the manufacture of various articles from either cold-setting or heat-treated plaster and/or thermo-plastic compounds.

EDUCATIONAL AND SCIENTIFIC PLASTICS, LTD.

392a, London Road,
Croydon, Surrey.

Polyvinyl Acetate

Sir,—In your March, 1950, issue reference is made to polyvinyl acetate solutions available in this country and it is stated that these are made from the solid polymer.

We would draw your attention to our range of "Vinalak" solutions of polyvinyl acetate of low and medium molecular weights, and would add that these are manufactured by solvent polymerization, thus effecting important economies in dollar expenditure.

VINYL PRODUCTS, LTD.

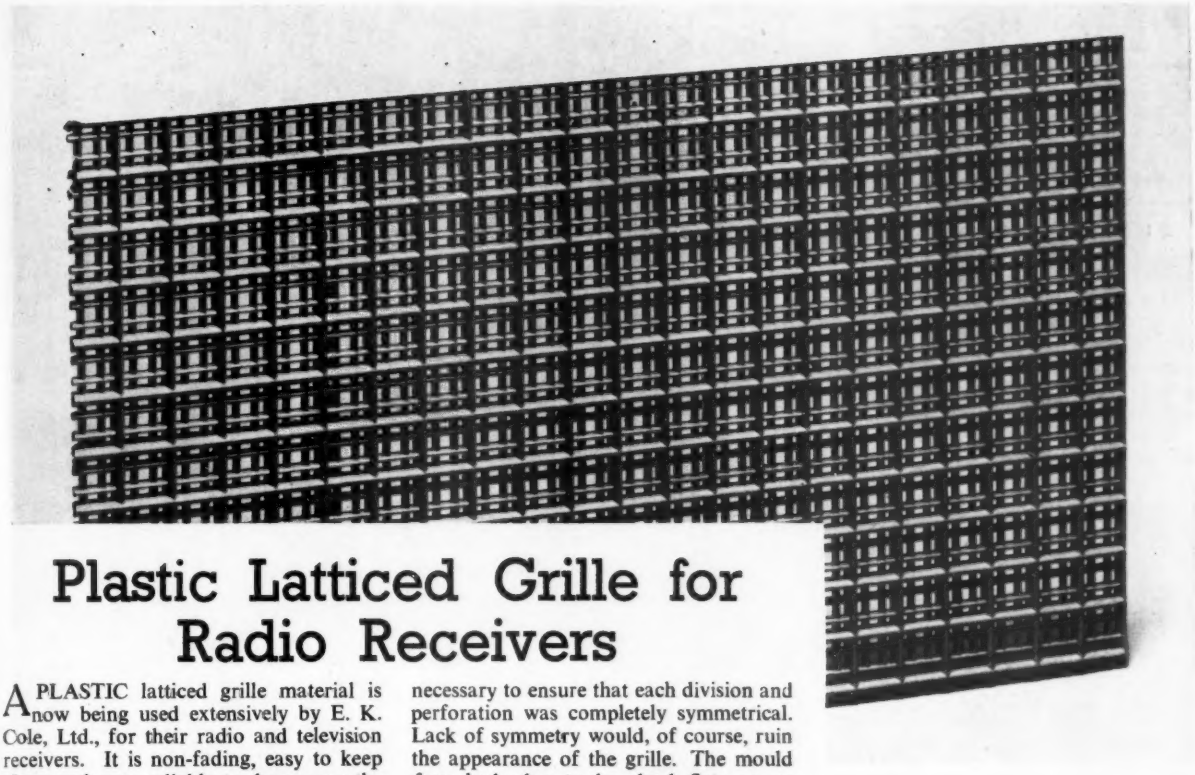
Butter Hill,
Carshalton, Surrey.

Laundry Bags

Sir,—I am anxious to employ a plastic wrapping for the carrying of dirty laundry to a self-service launderette; likewise for carrying home the slightly damp washing for ironing. It should preferably be transparent and able to carry some 9 lb. of laundry.

26, Bosworth Road, S. BENTALL.
New Barnet, Herts.

[EDITOR'S NOTE: This would appear to be a job for either polythene or vinyl sheeting, both of which would withstand the damp conditions "permanently." Large welded bags are already available in both materials for the chemical industry and in thicknesses which would enable them to carry 9 lb. and to be returnable.]



Plastic Latticed Grille for Radio Receivers

A PLASTIC latticed grille material is now being used extensively by E. K. Cole, Ltd., for their radio and television receivers. It is non-fading, easy to keep clean and not so liable to damage as the materials commonly used for grilles.

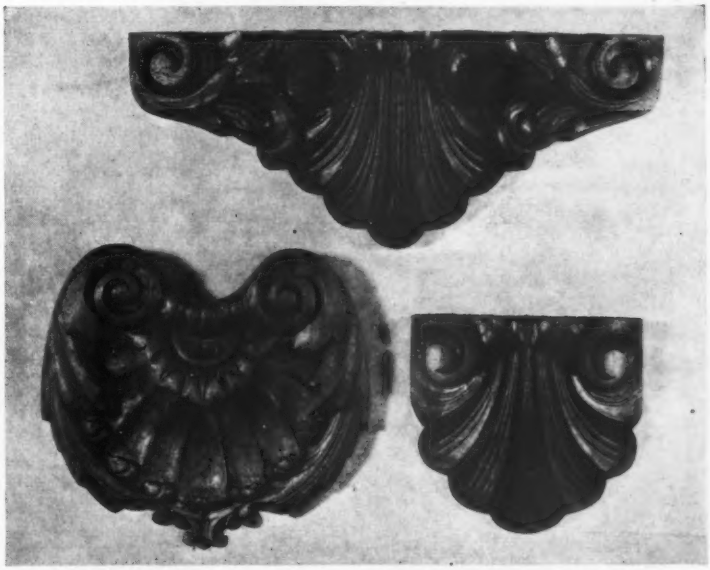
This injection moulding, developed and moulded by E. K. Cole's Plastics Division, has a projected area of 198 sq. in. and is probably the only one of its kind. The relation of a large surface area to a thickness of only 3-32 in. necessitates the use of injection moulding facilities far larger than would normally be required for a moulding of this weight (approx. 8 oz.).

To ensure a complete filling of the mould cavity, an injection pressure of 27,000 lb. per sq. in. is required and a clamping pressure (to keep the mould closed) of 600 tons. In practice, a 32-oz. machine was the smallest practicable size that could be used. To prevent cooling-off before the moulding material reaches the outer edges of the cavity, graduated mould temperatures are required.

The fact that this is a grille, and therefore perforated, makes it absolutely essential that each moulding is clean, i.e., that there is no flash filling the perforations. The clamping pressure referred to must at all times be sufficient, plus a safety factor, to keep the mould completely closed, since a finishing operation to clear flash from the perforations is quite impracticable. Actually, the only finishing operation required is the removing of the centre sprue. The cut to remove this sprue must be carefully regulated to ensure that the perforations normally covered by the sprue are completely clear after the sprue's removal.

In making the mould great care was necessary to ensure that each division and perforation was completely symmetrical. Lack of symmetry would, of course, ruin the appearance of the grille. The mould face had also to be dead flat, as no amount of clamping pressure would prevent the filling of the perforations if the mould faces were not accurate.

It is possible to use a number of thermoplastics as moulding materials—cellulose acetate, polystyrene, etc.—and a variety of colours can be obtained. Clear polystyrene is particularly suitable for post-moulding treatment, such as paint spraying, metallic finishes, etc. The materials can also be readily cut to any shape or size that may be required.



These imitation "wood carvings," for use as motifs in the decoration of furniture, are a new development by Lacrinoid Products Ltd., and are being exhibited for the first time at the Birmingham Section of the 1950 B.I.F. (see page 128). They have been cast in matrices made with "Vinamold" hot melt compound, which is made by Vinyl Products Ltd.

The "Resil" Pack

THE past five years have seen the launching in Gt. Britain of new conceptions of industrial packaging—a growth that reflects a new and welcome concentration on problems that had never been attacked in this country in pre-war days.

In this short period we have seen the appearance of several outstanding examples, of which the truly unbreakable bottle (for transporting corrosive or valuable liquids and solids), new types of film, expanded or honeycomb plastics, are rapidly finding their special niches.

In a field that is perhaps as difficult and important as any to attack, the material and method known as the "Resil" pack is surely worthy of special notice and praise, introducing a completely new technique and satisfying the dreams (or perhaps we should say, dispersing the nightmares) of many sections of the heavy and light industries.

In our September, 1949, issue we published a short description of this pack. We have now obtained further details of this development of the Pontefract Box Co., Ltd., 7, Sicilian Avenue, Southampton Row, London, W.C.1, together with additional examples for its appreciation.

Fig. 1.—"Resil" pack for "Exide" battery.

Fig. 2.—"Resil" pack for an electric hair-drier.

"Resil" is primarily a fibrous absorbent material obtained by the treatment of sawdust with synthetic resin in a water medium and a process which results in the formation of a "felt." Thus it is obvious that what might be termed "mouldings" may be obtained therefrom which, after drying free from water, retain their moulded form, and are solid structures. The "Resil" pack is therefore a resilient, absorbent moulding made specifically for each individual unit to be packed. Furthermore, the pack is, in effect, two mouldings, between which the object to be packed rests snugly without internal movement and is able to withstand rough handling and shocks to quite a remarkable degree. Where a glass bottle contains liquid and it is broken, the "Resil" material will absorb that liquid without danger of leakage.

We have therefore the primary requisites of modern packaging; the ability to transport units safely to their destination. But the value of the "Resil" pack goes far beyond this obvious necessity, for we have here the means of introducing such economies that we are virtually seeing a revolution in the art of packaging.

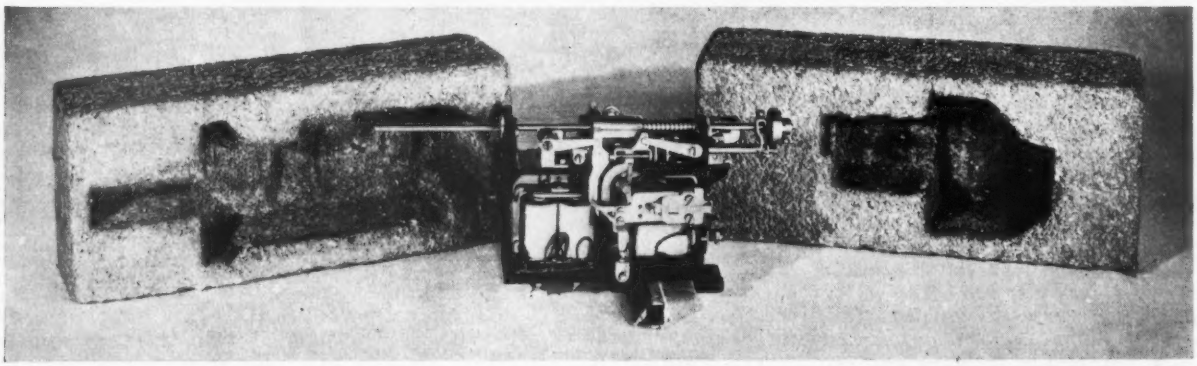


Fig. 3.—The delicate nature of the mechanism of this telephone relay switch takes full advantage of the safety in transport which is given by the "Resil" pack.

First, the degree of safety in transport of valuable or breakable units is stated to be complete—users have categorically stated that during more than a year of use no breakages whatsoever have occurred. Indeed, packages have been tested by dropping from considerable heights, and on to a number of different points of the package, without deleterious results. Secondly, time of packaging is negligible compared with the traditional methods, since so much hand-labour is avoided. Since the "Resil" pack is specially moulded for each individual job, the unit to be packed is simply "nested" into the two halves of simple form, and is then placed in a cardboard container.

Fig. 4 (above).—Adoption of the "Resil" pack for this electric iron completely eliminated claims for damage in rail transport.

Fig. 5 (left).—Large bottles containing liquid are safely conveyed in the "Resil" pack, with an outer cardboard box.

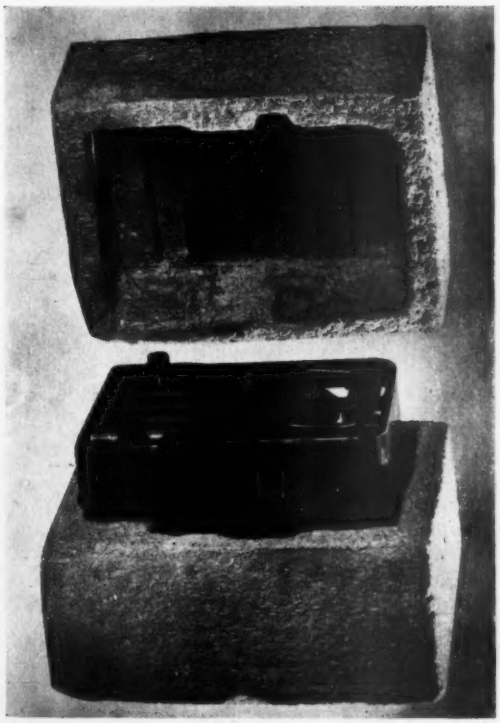


Fig. 6.—"Resil" pack as applied to an electricity meter.

The method is clearly seen in the accompanying photographs of a variety of "Resil" units. The "Exide" pack is of special interest to exporters, because it marked a minor revolution in shipping practice, the batteries being accepted for export in cardboard boxes. Before this acceptance, a battery was dropped 16 ft. without suffering damage. In the case of the electric iron, there was especial risk of damage owing to the odd degree of balance and the presence of the vitreous enamel hood, but here the use of the "Resil" pack completely eliminated claims, to the satisfaction of the Railway Tribunal, which also accepted the pack for the Winchester bottle.

The latter pack (see Fig. 5) is of special interest to the chemical industry, which has long been burdened with the difficulties and labour complexities entailed in packing a large bottle containing liquid. It will be noted that the pack is moulded so that the "shoulders" are especially strengthened.

As to costs, which are always a matter of contention, the "Resil" pack is expensive compared with, say, corrugated cardboard; it is not competitive with cheap materials if the latter are satisfactory. But there, of course, the comparison ends, for "Resil" deals with special units, and there it has its advantages which, we believe, no other method can approach.

An American concern, British Overseas Mart, Inc., of 1775 Broadway, New York, has been formed to set up a complete sales organization with a new plan for selling British-made goods, including plastics, in the U.S.A. One of the principals in this venture is Mr. William Carduner, who is also a principal of British Industries Corporation, of New York, which represents several well-known British engineering concerns in America with outstanding success.

Thermoplastics for Temporary Mechanical Protection of Materials and Equipment—IV

By E. E. HALLS

WHILST "Birlon" is cited as the result of the first intensive endeavour in this country to cater for mechanical protection by means of a strippable lacquer, other products have also been tried, although not always with the same success.

In one case the film was almost opaque, which is a drawback if applied by the supplier, because perfection of the material surface cannot be examined. In another case the film tore and lifted from the edge of drillings, saw cuts, engravings, etc. During pack milling of components coated on both sides, the heat liberated in the machining also caused the adjacent films to edge-seal, and the complete films to strip off when the components were separated. These shortcomings, of course, are relatively small points for improvement in future development, and have been taken care of in the formulation of "Birlon."

For comparison with the polyvinyl solutions which yield dry, strippable films, it is apt at this point to refer to naphthenates and their applications in this field. The latter, however, are merely resin-like films, are not strippable in the above sense, although quite easily removed. Naphthenate solutions for specific purposes have found interesting uses and satisfy the following criteria:—

(a) Readily available and inexpensive.

(b) Simply applied by spray, brush, dip or roller, involving no abnormal fire or health hazard.

(c) Non-corrosive.

(d) Applied without detriment to a wide range of materials, including most thermoplastics and enamel finishes.

(e) Thickness applied need not be excessive, and is easily controlled.

(f) Easily removed by means of solvent.

(g) Correct mechanical properties for withstanding abrasion, impact, etc.

(h) Excellent adhesion.

(i) Properties of naphthenate film do not retard normal fabrication operations.

(j) Film is inert and stable for indefinite periods.

The naphthenate solutions thus have a wide range of application. Nevertheless, it is an obvious precaution and usual practice to conduct a laboratory trial before launching the full-scale process in production. This procedure is particularly important when dealing with thermoplastics and organic enamelled-base materials, especially with respect to any possible effect on colour.

The metallic naphthenates employed for preparing these solutions are resin-like solids, ranging from hard to soft and sticky. They are soluble in the inexpensive hydrocarbon solvents, such as the coal-tar and petroleum derivatives, from which they can be re-deposited in continuous and tenacious films. The properties of the latter are determined by the particular choice of naphthenate, or blend of naphthenates. All of them possess good adhesion to metal, plastics, ceramics or glass. The harder ones show some tendency to fracture or chip under impact, as from a glancing blow from the edge of one component or sheet upon the coated surface of another. The softer naphthenate films are free from this shortcoming. The films tend to retain some degree of tackiness, particularly those produced from the softer grades; this property is an advantage in many circumstances.

The usual grade of naphthenate solution employed for the mechanical protection of surfaces is a medium-hard blend in petroleum white spirit; this is satisfactory for most of the applications concerned. For a more rapid flash-off of the applied film, a medium petroleum benzine may be employed.

It should be noted that the use of these petroleum solvents has many advantages. They are the least expensive of the organic solvents, and require only the normal finishing-shop precautions to safeguard against fire risks. Further, they are among the least toxic of the solvents. Their greatest advantage, however, is inertness towards thermoplastics, and paint and enamel films; polystyrene is one exception. Cellulose acetate (and acetate-butyrate) and methyl methacrylate can be safely coated, as these hydrocarbons exert no solvent action upon them.

Light benzine and white spirit may be regarded as representing the useful extremes of the volatile petroleum-solvent range, and characteristics of typical grades are given in Table 1. Relative volatilities are plotted graphically in Fig. 1, to give a clearer distinction. Boiling ranges are shown in Fig. 2. The values for these curves were determined by absorbing about 0.5 gm. of the liquid in a filter paper, removing the excess by pressing lightly between two filter papers, and suspending the saturated paper on a balance arm and recording the amount of loss in definite increments of time. The value for the initial weight of solvent is extrapolated, and the curves here given show the percentage loss in weight against time elapsed.

A typical grade of naphthenate solution used in the present application is primarily a copper naphthenate base in white spirit, the total solids (film forming) content being 50 to 55 per cent. It has a viscous but easily sprayable consistency, having the high value of 300 to 350 seconds through a No. 4 Ford cup at 25 degrees C. The specific gravity of the solution is 0.95 to 0.96 at 25 degrees C.

Table 1.—Characteristics of Typical Grades of Petroleum Solvents.

	Light Benzine	White Spirit
Colour	Water white	Water white
Sp. Gr. at 15.5°C	0.745	0.798
Residue on evaporation %	nil	0.005
Acidity	nil	nil

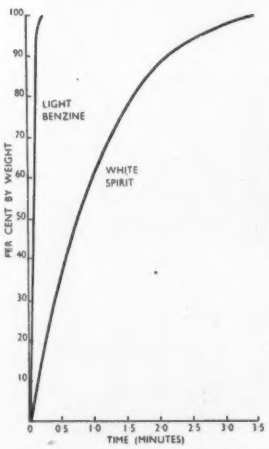


Fig. 1.—Evaporation rate for petroleum spirit.

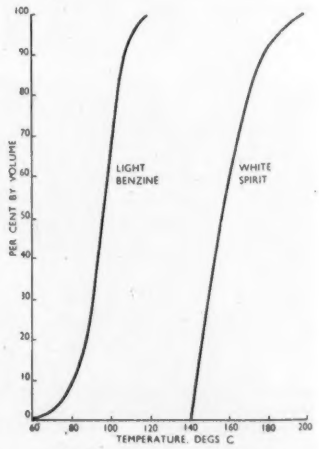


Fig. 2.—Boiling range for petroleum spirit.

One of the first commercial uses of the naphthenate solution for mechanical protection was the coating of " Perspex " lenses for safeguarding the surfaces in machining and grinding operations. Here the softness and slight tackiness of the coating were distinct advantages in holding these components. Success in this field suggested others.

Synthetic resin laminated sheet was given first attention. In the initial study, small panels of this material were coated by dipping, draining and air-drying. The solution was used in the undiluted condition, and thinned 50/50 with white spirit and with benzine. Specimens were allowed 24 hours' air-drying time, although they were virtually dry in one hour, except at the drain-down edge where the coating was naturally thicker.

The first test applied to the specimens was engraving with circles and characters on both sides; in this way, both surfaces of the material were exposed upwards and downwards on the engraving machine. The coating was then removed with white spirit and the surfaces examined. They were found to be in perfect condition, entirely scratch free. The slight tackiness of the coating had caused dust and dirt to adhere to the coating, but even this had not damaged the material through the film.

Degree of Protection Obtained

To examine the degree of protection afforded against the sliding of sheets one over another in store, coated specimens with both thick and thin films were briskly rubbed to and fro over an unplaned beechwood block until the coating was nearly worn through. Subsequent examination showed that complete protection was afforded. Similar tests were made on clear colourless and opaque white grades of cellulose acetate sheet, and equally successful results were obtained.

Production trials were made on full-sized sheets of " sandwich " board, applying the protection to the face side only. A preliminary clean was given by wiping with a cloth moistened with benzine, and then the naphthenate solution was applied by spraying at 35-40 lb. air pressure, using an ordinary type of spray gun. The solution was used without dilution, and it sprayed quite well, flowing out to an even film of thickness between 0.001 and 0.002 in. Coated sheets were passed into production, which involved sawing to small panels, milling the edges of the latter, drilling, countersinking and engraving. The only faults found were a cutter mark, due to a wrong machine setting, and a sharp scriber mark. These were discounted, being due to the operator's carelessness. Otherwise all surfaces were blemish-free.

One difficulty, however, was reported; after pack milling, the small panels were difficult to separate, due to the tendency of the naphthenate to cement the pieces together.

Continuous production has established that this naphthenate coating process is not only successful in giving full protection to the " sandwich " boards (e.g., white urea core and black phenolic laminated faces, white faces and black core, etc.), but also to resin-bonded paper and fabric sheets, to cellulose acetate in transparent and opaque grades, and to the methyl methacrylates (transparent and translucent varieties).

The success of the naphthenate solutions on the methacrylate sheet is of special interest, because this material is an expensive one, and is employed for the fabrication of components where surface condition is important. Further, there is usually much machining involved, as illustrated by dials used in radio equipment.

Previously, protection was afforded to this material by supplying it, faced with a rather low grade of paper of 4 to 5 mil. thickness, this being secured to the surface of the material with a water soluble gum. Often the paper was adrift by the time the material was received, or it parted from the surface in storage. In any case, it came adrift during machining operations, so that its benefit was little more than could be provided by a loose paper interleaving. The naphthenate solution, on the contrary, may be regarded as " permanent " in the sense that it can be removed only by solvent, and is therefore present until intentionally removed at the completion of all operations.

Table 2.—Characteristics of M.G. Sulphite Tissues.

Substance	12 lb.	10 lb.	12 lb.	10 lb.
Weight basis (lb./D.C.R.)	13.5	9.8	11.5	10.4
Thickness (inch.) min. ..	0.0014	0.0012	0.0015	0.0013
" " max. ..	0.0018	0.0015	0.0018	0.0017
Bursting strength (lb./sq. in.) min.	13	3.5	5.0	7.0
" " max.	23	8	7.5	10.5
Reaction	faintly acid	neutral	neutral	neutral

Table 3.—Characteristics of Brown Kraft Wrapping Papers.

Substance	40 lb.	45 lb.	48 lb.	45 lb.
Weight basis (lbs./D.C.R.)	39.4	46.6	48.3	44.6
Thickness (inch.) min. ..	0.0022	0.0030	0.0030	0.0030
" " max. ..	0.0024	0.0035	0.0034	0.0033
Bursting strength (lb./sq. in.) min.	27	22	28	33
" " max.	37	27	40	40
Reaction	faintly acid	neutral	neutral	neutral

The naphthenate solutions may also be used in conjunction with paper. For example, if material is to be purchased ready-coated, or sprayed upon receipt and, immediately after inspection for surface appearance, dimensions, etc., is then to be stacked in storage racks for indefinite periods, there may be a tendency for the sheets to stick together, due to the weight of the pile. This is entirely offset by using a sheet of thin tissue paper to cover the coating. The procedure is also useful when dealing with heavy metal panels upon which there is much machining, as it assists in the easy removal of metal swarf by blowing off.

The paper is fixed shortly after spraying the coating, and is evenly applied by rolling with a squeegee. A suitable paper is an M.G. sulphite tissue, of thickness 0.0015 to 0.0020 in. or its equivalent. White paper is preferred, but by no means essential, provided that steps are taken to ensure that colourant is not transferred from the paper to the plastic base material. This warning is given because many cheap " brown " papers are dyed to mask their heterogeneity, and generally there are tiny spots of undispersed dye, which can bleed through the naphthenate film and into thermoplastics (as with cellulose acetate) to ruin their appearance.

In Table 2 are given characteristics of white sulphite tissues of various substances, of which the 12 lb. per D.C.R. is most generally suitable. If a heavier paper is required, a tougher Kraft may be employed, such as one of 40 to 60 lb. substance per D.C.R. Characteristics of paper of this type are given in Table 3.

Production Viewpoint

Temporary mechanical protection is desired for enamelled work, especially large panels, framework, cabinets or other sheet-metal components. All are concerned where the final finishing is performed at the commencement of the line of assembly operations. Storage, trucking, assembly operations, and inspection activities may cover a period of many months. This is particularly the case in radio and telecommunications.

From a production viewpoint the problem has not yet been solved, but it is claimed that the naphthenate film offers the most advantages. Stove-enamelled finishes and, to a lesser degree, cellulose finishes, are those generally involved. With air-drying oil or synthetic finishes, solvent action may occur. In all cases, trials should be made to ensure that no change occurs in the colour shade or gloss of the enamel. To some extent, this may be a function of the degree of stoving or the time period of air-drying before the naphthenate film is applied.

This protective treatment has been successfully applied to the following finishes:—

(1) Stoved broken-white synthetic enamel (alkyd-urea type) stoved 30 mins. at 250 degrees F.

(2) Dark and light battleship-grey enamels (oil-modified glyptal type), stoved 30 mins. at 250 degrees F.

(3) Dark-green enamel (oil-modified glyptal type), stoved 30 mins. at 250 degrees F.

(4) Dead mat, high-temperature stoving black enamel (oil-base black), stoved 30 mins. at 500 degrees F.

(5) Glossy white cellulose enamel.

The only failure found in a series of tests was a light pastel shade of eau-de-nil green; this became slightly more green and generally looked "cleaner." The possibilities of the successful use of naphthenate solutions in this field are, therefore, very real. One example immediately comes to mind. Often "front" panels are finished for stock, and operations of drilling, tapping, engraving, etc., are performed later as required for individual applications. Naphthenate protection for storage and through all these operations is very apt, and its final removal by means of white spirit or other solvent can conveniently take care of the removal of swarf and machine lubricants.

The naphthenate solutions are equally applicable to the mechanical protection of metals in sheet, bar, section, etc., in all the fields already mentioned. The radio industry is concerned with the fabrication of many metals in a multitude of forms, and in preserving undamaged surfaces for various reasons: brass for designation strips, panels, condenser vanes; and aluminium for panels, chassis, structural work. These are specific examples. Other industries are concerned with raw material, components and finished equipments, and with metal and electroplated metal. The electroplated surfaces of bumper bars, head lamps, etc., on automobiles for export suggest themselves for consideration. Again, plated raw materials for quite ordinary uses, such as aluminium-clad steel and electro zinc-plated and phosphatized steel sheet, definitely demand some simple protection to avoid scratching.

The "Birlon" type of film has special merits for the protection of sheet-metal work during bending and deep drawing, still retaining its continuity unruptured. The naphthenate film has not been examined through operations of this kind, and whilst it would give mechanical protection and in no way hinder the normal lubrication of the operation, it would not function in the same manner as the vinyl film.

It will have been noted that vinyl plastic film of the "Birlon" type is removable at the end of its functional period by simple stripping or peeling, and that it is not easily removable by means of solvent. In contrast with this, the naphthenate type of film is only removable by means of solvent, and is not mechanically strippable.

The use of naphthenate solutions for the surface protection of materials and manufactured articles is covered by B.P. 612,981 (1948). This patent cites as a leading example

Table 4.

(1)	For a very hard film:	
	Nickel naphthenate	50 parts by wt.
	White spirit or benzine	50 " " "
	The proportion of naphthenate to solvent varies according to the viscosity and the thickness of the film required.	
(2)	For a medium hard film:	
	Copper naphthenate	40 parts by wt.
	Zinc naphthenate	30 " " "
	White spirit or benzine	60 " " "
	alternatively—	
	Manganese naphthenate	60 parts by wt.
	Lead naphthenate	30 " " "
	White spirit or benzine	80 " " "
(3)	For a soft tacky film:	
	Zinc naphthenate	80 parts by wt.
	White spirit	25 " " "
	alternatively—	
	Lead naphthenate	75 parts by wt.
	White spirit	25 " " "
4)	Copper naphthenate	34 parts by wt.
	Zinc naphthenate	54 " " "
	Nickel naphthenate	12 " " "
	White spirit	76 " " "
(5)	Copper naphthenate	34 parts by wt.
	Zinc naphthenate	54 " " "
	Nickel naphthenate	12 " " "
	Naphtha	62 " " "

the production of plastic lenses from polymethyl methacrylate or polystyrene, where such moulded lenses are subjected to operations of grinding the edges and bevelling.

During the first of these operations the lens is held between two rotating spindles against the grinding wheel, and during the second operation it may be held by hand against the machine tool, so that in both cases there is a strong possibility of the soft plastic surface becoming damaged. One method hitherto used to give protection has been that of securing paper or fabric over the surfaces, but this entails the laborious operation of applying the paper and later removing it.

Properties of naphthenates are quoted in this patent:—

(a) Some of them are hard and brittle or hard and tough, e.g., nickel or manganese naphthenate.

(b) Some are soft and tacky, e.g., zinc or lead naphthenate.

(c) They are all mutually miscible in any proportion, so that by compounding the hardest and softest any intermediate stage of hardness can be obtained.

(d) They are all soluble in petroleum solvent, such as benzine or white spirit; in chlorinated hydro-carbon solvents, such as trichlorethylene; and in coal tar solvents, such as benzol and the naphthas. Thus a suitable solvent can be chosen not to damage the plastic.

(e) All the metallic naphthenates are transparent; therefore engravings on the coated object can still be seen.

(f) All the naphthenates are coloured to a greater or lesser extent; e.g., copper naphthenate is brilliant green; manganese naphthenate is rich brown; nickel is pale green; zinc is pale yellow, and in thin films almost colourless. It is therefore possible to use a distinctive colour from which to observe that the object is uniformly coated; or again, to be sure when the whole of the coating has been removed; likewise it is possible to choose a very pale-coloured materials, so that the film is almost invisible.

(g) Most naphthenate films are water repellent, which is a property having specific advantages, e.g., to give added protection to the coated objects during transit.

For lenses the patent quotes a mixture of copper, nickel and zinc naphthenates as the preferred mixture. The lens is coated by dipping, spraying or brushing with a white spirit or petroleum benzine solution of the naphthenate or mixed naphthenates. This coating is allowed to dry for an hour or so, to permit the solvent to evaporate and leave a strongly adherent film of solid naphthenate. The patent claims that the lens can be handled and mechanically worked quite safely in the grinding machine without damaging or marring the surface. The film is removed after operations and the lens recovered intact.

Another example of the use of metallic naphthenate films, as cited in the B.P. 612,981, is for the protection of the surface of synthetic resin-bonded laminated sheets. The object here is to protect these sheets, particularly during machine-shop operations, when the sheets may be dragged over one another.

Tissue paper may be used as additional protection and applied just before the solvent has entirely evaporated.

Other plastics, metals and decorative glass can be similarly coated. Examples of compositions are given in Table 4.

On drying, these solutions yield films which are sufficiently hard and yet non-friable and very adherent. The naphthenate may, however, be modified for special purposes by including waxes or low molecular weight resins which are soluble in white spirit. For the protection of glass or metallic surfaces not affected by organic solvents the above compositions may be used with trichlorethylene or naphtha, to obtain more rapid drying.

Again, when naphtha or a chlorinated hydrocarbon type of solvent is employed, a small proportion (up to 5 per cent. by weight of the composition of rubber, synthetic rubber or similar soluble polymers and synthetic resins may be compounded with the naphthenates to obtain modified properties.

New Productions in Plastics

Shoe-trees

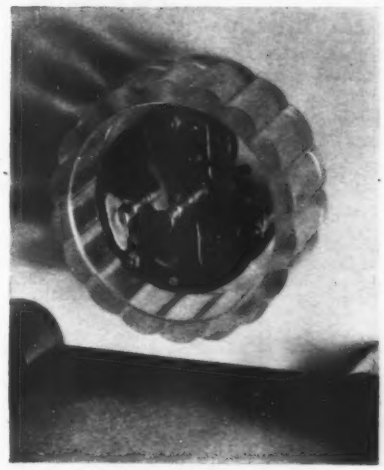
The plastic parts of these shoe-trees, sold under the trade name "Evo," are manufactured by Metropolitan Plastics, Ltd., 17-20, Glenville Grove, Deptford, S.E.8, for E. Voss, 394, Harrow Road, W.9. As seen from the illustrations, there are two distinct types, one being the split shoe-tree for use in men's shoes, and for ladies' shoes of the brogue type, and the other a fore-part shoe-tree for ladies' backless shoes. The materials used are phenol-formaldehyde and urea-formaldehyde. A range of attractive colours are used for the models for ladies' use; for men, there is a standard walnut colour.

Toilet-pack Holder

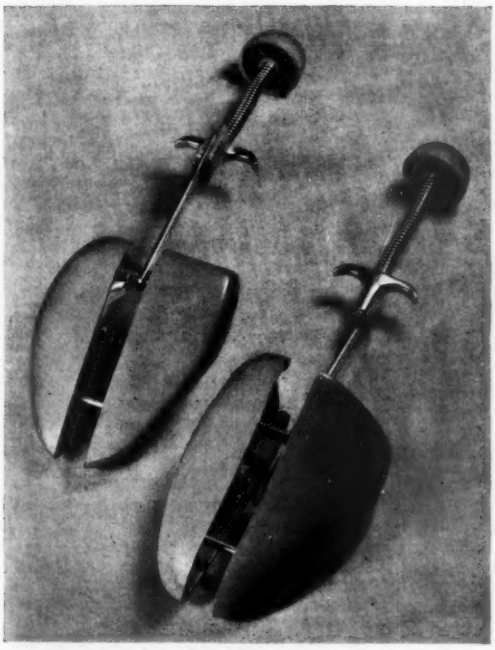
A new plastic and chromium toilet-pack holder, embodying improvements, is being marketed by W. C. Youngman, Ltd. One of the "Leda" range of bathroom fittings, it has been specially designed to take interleaved toilet paper and thus eliminates the waste normally entailed with toilet rolls. Moulded in ivory urea material by Lorival Plastics, with rustless metal parts, the holder totally encloses the pack so that dirt and dust cannot enter. An interesting feature is an ash tray, which is hinged at the top and functions as a lid. The action of emptying the ash tray also opens the container for easy refiling. Slots at the back of the pack enable the container to be mounted accurately even if the fixing screws themselves are not in line.

Clock and Candle-holders

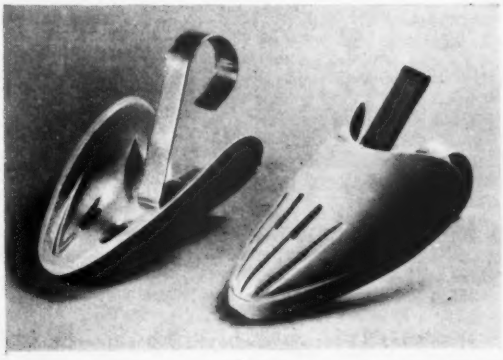
This pleasing modern design for a clock and pair of candle-holders comes from O'Keeffe Bros., 154, Burges Road, London, E.6. The clock face, backplate and uprights are of "Perspex" of a pastel shade; the black feet and numeral markings are "Catalin." As seen from one of our photographs, the clock mechanism is protected by a drum-like enclosure made of transparent "Catalin." The candle-holders are of "Perspex," with contrasting base made from a p.v.c. extrusion.



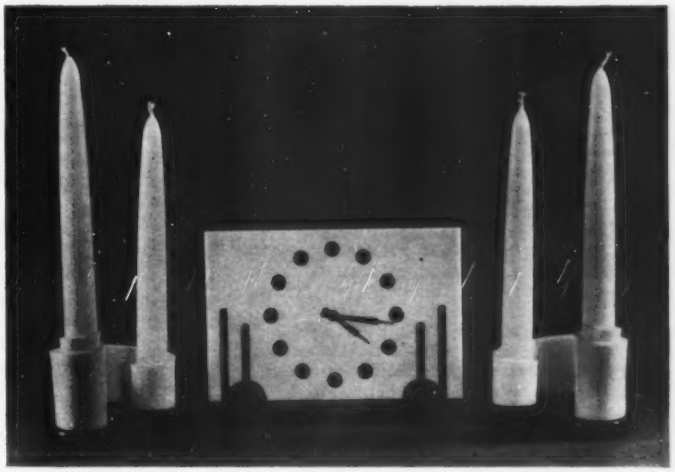
Protection for clock mechanism.



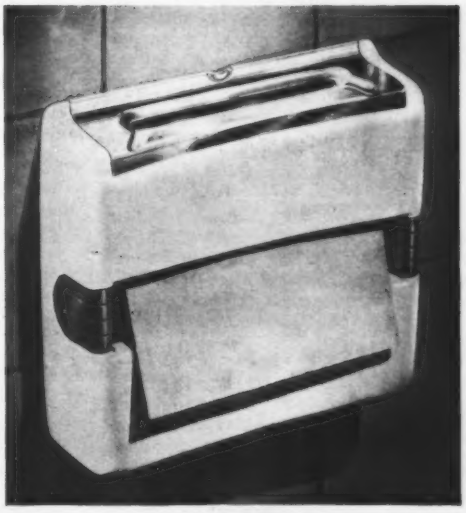
(Above) Split-type shoe-trees for men's shoes and ladies' brogues.



(Right) Fore-part shoe-trees for ladies' backless shoes.



(Above) Modern design for clock and candlesticks.



Toilet-pack holder.

PRODUCTION NEWS

Raw Materials, New Plant, Works Organization, Control Apparatus, Research, Personal and Trade Notes

FILM THICKNESS MEASUREMENT. The M.P.J. Filmeter, by M.P.J. Gauge and Tool Co., Ltd., Hansons Bridge Road, Erdington, Birmingham, is a light, portable, robust mains-operated meter for measuring electrically insulated coatings, such as cellulose, enamels, sprayed plastics, etc., on any metallic surface. An important feature is the single contact head, in which the contacting electrode is a highly polished sphere, giving spot readings unaffected by moderate curvature of the surface under test. Readings are independent of alloy or thickness of base metal.

Various measuring heads, incorporating a built-in standardizing capacitor, can be supplied to suit individual applications, these heads being connected to the indicating unit by a flexible cable. The meter can be scaled for various thickness ranges up to about .050 in. coating. Once the meter is calibrated for a specific application, it is only necessary to contact the surface of the coating with the electrode, and press the button in the head to obtain a reading. There is little danger of damage to the most delicate finish, as the polished electrode only needs to contact it without pressure, and there is no danger to personnel, as the head only carries a low radio frequency voltage.

With specially designed heads, the meter may also be used to measure the thickness of rubber or plastic sheet during manufacture, or other measurement applications resolved into small capacity changes.

BUTYL ALCOHOL.—British Industrial Solvents, Ltd., have reduced the price of "Bisol" butyl alcohol by £6 per ton on all dispatches made on and after April 3, 1950, and until further notice. This price reduction applies to contract as well as spot purchases. The price schedule for this material will, from that date, be as follows:

10 tons	£139 10s. per ton.
1 ton to 10 tons ...	£140 10s. per ton.
Less than 1 ton ...	£141 10s. per ton.

Deliveries in 10-gallon drums, £15 per ton extra; in 5-gallon drums, £20 per ton extra. Carriage paid in 45-gallon drums, packages returnable carriage forward. The tank wagon allowance for deliveries in minimum 2,000-gallon loads is £1 per ton; in minimum 500-gallon loads, 10s. per ton.

STYRENE SUPPLIES.—British Petroleum Chemicals, Ltd. (jointly owned by Anglo-Iranian Oil Co., Ltd., and The Distillers Co., Ltd.), and Monsanto Chemicals, Ltd., announce that they have formed a new company called Forth Chemicals, Ltd. This company will be concerned in the first instance with the manufacture of monomeric styrene required by the plastics industry. British Petroleum Chemicals, Ltd., is at present constructing a plant at Grangemouth for the production of chemicals from petroleum.

PLASTICS IN GERMANY.—Mr. Tom Usher, a director of East Anglia Plastics, Ltd., of Aycliffe, near Darlington, Co. Durham, recently returned from a three weeks' trip to Germany and Switzerland during which he visited the centres of the plastics industry in these countries, particularly Cologne and Dusseldorf, to find out what advances the industry had made in post-war European rival zones.

A. BOAKE, ROBERTS AND CO., LTD., inform us that progress is being made with the building of their new works at Rainham, Essex. It is the Company's intention ultimately to transfer the whole of their chemical production from Stratford to this 29-acre site at Rainham. Already at Rainham a new plant is being erected for the production of tri-cresyl phosphate; this plant will be in operation in four months' time, and will contribute an additional 4,000 tons a year of this important plasticizer to the present "Abrac" output. The tri-cresyl phosphate plant at Stratford will also continue in use. A. Boake, Roberts and Co., Ltd., also announce that their sales office has moved moved from Buckhurst Hill, Essex, to 100, Carpenters Road, Stratford, London, E.15. (Telephone: Maryland 5511.)

REDIWELD, LTD., Broomhill Road, Wandsworth, S.W.18, have sent us a copy of their new 24-page booklet relating to polythene products. Illustrations are included showing buckets, safety jugs, jars, tank linings, valves, pipes and pipe fittings, chimneys, stirrers, fume hoods, and insulators for electrostatic dust precipitation, all fabricated in polythene. Cast polythene pipes are available with bores ranging from 1⅛ ins. to 23¼ ins.; these pipes are centrifugally cast in 3-ft. lengths (wall thickness ¼ in.), but can be supplied up to a length of 12 ft.; i.e., four 3-ft. lengths welded together. The present booklet also includes useful tables showing the physical properties and chemical resistance of polythene. Another new publication of Rediweld, Ltd., relates to "Redwin" p.v.c. filter cloth, and textiles woven from unplasticized p.v.c. filaments and fibres; the textiles are employed in making protective clothing.

UNITED EBONITE AND LORIVAL, LTD., have just issued a new leaflet containing a detailed list of the types and sizes of ebonite bobbin which are available for the textile industry. Figuring in this list for the first time are the new Lorival lightweight bobbins. Designed specifically for the many spinning applications where bobbin weight is a prime consideration, these new products retain all the unique features of the original ebonite bobbin, coupled with a substantial reduction in weight which, in some cases, is as much as 50 per cent. The weight reduction was achieved by moulding a coarse spiral thread inside the bobbin. This provides a bearing surface which locates on the spindle along the whole bobbin length.

ALKATHENE FILM.—There was a misprint in the announcement of "Alkathene" film gauge numbers on page 111 of our April issue. The thickness of film gauge No. 300 should read 0.003 in.

WILLIAM JESSOP AND SONS, LTD., Brightside Works, Sheffield, makers of alloy and tool steels and cemented carbide tools and dies, announce a change in the location of their London office, which in future will operate from Kingsway Chambers, 44-46, Kingsway, London, W.C.2. (Telephone: Holborn 7145-6.)

WALKER LITHERLAND PLASTICS, LTD., manufacturers of umbrella handles, fabricators and moulders, Atlas Road, Darwen, Lancs, inform us that their plastic department has been established as an independent limited company and will trade under the above name.

TENAPLAS, LTD.—Mr. John C. Bretherton, of The Red Cow Cottage, Cholsey, Berks, has been appointed advertising manager to Tenaplas, Ltd., Upper Basildon, near Reading, Berkshire.

MONSANTO CHEMICALS, LTD.—Professor E. K. Rideal and Mr. G. Tyser have been appointed directors of this company.

RADIO HEATERS, LTD. announce a change of address to Eastheath Avenue, Wokingham, Berks. (Telephone: Wokingham 1030-1).

FRANCIS SHAW AND CO., LTD., regret to announce the death on March 4 of Mr. Eric Foy, one of their leading technical representatives.

EXPORT INQUIRY.—The British Legation at Managua, Nicaragua, Central America, has received an inquiry from Mr. J. S. Mason, 4a, Calle Noreste, No. 307, Managua, Nicaragua, for hand-operated presses for producing plastics toys, etc., including dies and supplies of plastics materials for moulding.

P.I.G.S.—A team of the London Section of the Plastics Industry Golfing Society met a team of Erinoid golfers at Stinchcombe Hill, Gloucestershire, on March 24. The result of the match was a tie. An afternoon competition for the "Waldron" Trophy presented by Mr. W. G. Waldron, a former chairman of Erinoid, Ltd., was won by Mr. J. Aldred. The whole of the arrangements for this enjoyable meeting were made by the staff of Erinoid, Ltd., and at a subsequent dinner at which the London members were guests, the chair was taken by Mr. John Harvey, managing director of the company, who proposed the toast of the Society. Mr. C. C. Last responded.

BACK ISSUES OF "PLASTICS."—A complete set of the issues of "Plastics," from 1943 to 1949 inclusive, are for disposal. Communications should be sent to Mr. A. Sandell, 74, Aberdeen Road, London, N.5.

Successful Designing for Plastics Moulding—X

By W. M. HALLIDAY

THE construction and method of operation of a mould, whether it be of the compression or injection type, may often be considerably complicated and increased in cost if the component has to be fashioned with internal or external undercut portions of the kind illustrated in Fig. 1.

The reproduction of the type of component shape shown at A (Fig. 1) will, for example, present several difficulties for the mould designer, and toolmaker charged with making a tool for such a part.

This diagram is a cross-sectional outline of a hollow receptacle which may be either cylindrical or rectangular. It will be specially noted that this part has to be formed with an enlarged recessed portion "b" moulded between the base and the side walls on the inside of the container. This recess is located at the base of the internal opening as indicated, and the width of this portion is greater than the remainder of the internal opening, thereby creating an undercut within the component.

If such a component were to be produced as a compression moulding it would become necessary to employ a split kind of core plug for the formation of the entire internal shape, so that the enlarged recess "b" could be satisfactorily formed. After moulding-cure, the tool would be opened along the parting-line "a—a," and then the split core would have to be collapsed, in order to permit the finished article to be removed with safety and ease.

Obviously, coring provisions of this character would involve a much greater amount of work when manufacturing the tool, and, in addition, its subsequent operation would be considerably slowed down in speed, so that the ultimate production rate of finished moulded articles would be appreciably diminished, with resultant increase in the unit cost of moulding.

Other troubles would also almost certainly arise after such a mould had been in use for a period, due to the wear or misalignment of the split portions of the core forming the female shape of the component. As a result of such wear, etc., flashings would be formed on the internal walls of the part; if these were of any magnitude their removal would be somewhat difficult, due to their location deep down within the article.

If the splits of the core member were to be reassembled out of line, due to distorted or worn dowels, or to the presence of dirt between the matching faces, additional flash would be caused on the sides of the article.

In the case of a component of this design form required in a thermoplastic material and requiring moulding by the injection method, similar difficulties would be encountered. A split or collapsible type of core would have to be employed, or alternatively the recess could be omitted altogether from the moulding process and left for machining at a subsequent operation.

The sectioned design shown at B (Fig. 1) depicts one simple way in which these difficulties may be overcome so that the undercut portion could be formed without introducing very expensive and complicated modifications to the mould construction. From this illustration it will be observed that the internal opening in the component is continued clean through the base wall.

Two mould cores would be required for this purpose. The whole of the cavity formation would be contained within one mould block, and in the base of this cavity a fixed core plug would be mounted to form the two recesses, "d" and "e" respectively. The latter recess would be made slightly larger than the former, to produce a square step or shoulder at the junction of the two features.

Another core plug would be carried in the mating mould block to form the main portion of the internal opening extending to the upper edge of the first recess "d." Both cores would have to be closely fitted for sealing at this point.

The dimensions of the bottom recess "e" would have to be controlled within reasonably close limits of variation, in order to allow a simple moulded disc or plate (in the same material) to be press-fitted tightly into the recess after the main component had been moulded.

The provision of such a simple disc would present no serious or costly toolmaking problems, and the costs involved in producing such a part, even in a separate mould, would in all probability prove far less than the cost of manufacturing a complex mould employing split cores, etc., after the fashion already described.

By this simple adaptation of the original design form at A, tooling costs would be kept at a minimum, the shape of the component would be retained substantially as desired, and the speed of production would be maintained at a reasonable level, especially in the case of an injection moulded article.

The diagram depicted at C indicates yet another very common design form often encountered in respect of mouldings required for industrial purposes. From this sectioned sketch it will be observed that the upper edges of the component lying on the parting-line "a—a" are extended inwards towards each other for a certain distance in order to produce a narrowed opening as shown at "b." By this means lips or ledges are provided on the part, against which a cover plate or lid may be affixed to the box component.

The width across the opening "b," it should be noted, is much less than the distance "c" of the lower portion of the opening, thereby creating a substantial undercut around the inside of the part. Reproduction of such an undercut would give rise to certain difficulties and objectionable features for the designer.

To reproduce such a shape satisfactorily a split core plug would be required with either a compression or injection mould, and the same objections noted in respect of the component shown at A would be associated with such a tool.

A fourth design D (Fig. 1) depicts a far more economical and preferable way in which the component could be redesigned in order to retain the ledge extensions.

As will be seen with this altered design form the internal opening in the article is left perfectly free from any undercuts simply by locating the ledges on the external sides of the part. This will permit the use of a solid-type single-piece core plug for the formation of the entire internal shape of the part, and the mould would again be parted along the line "a—a," as with the previous examples.

The cavity would be contained wholly within one mould block, and the portions required for the reproduction of the ledge extensions all round the exterior would be easily machined directly into the parting-line surface of the block containing the cavity.

The overall width of the component would, of course, be increased by the disposition of the ledges externally, but in most cases this would offer no insuperable objections to a user, especially when contrasted with the undoubted economies obtainable in respect of initial mould cost, and more simplified usage of the tool.

The section E (Fig. 1) illustrates a rather more intricate component configuration which possesses certain interesting features of design. Once again this component is a hollow container to be produced from a mould, preferably to be parted along the straight top surface "a—a," as shown.

In the left-hand side vertical wall there

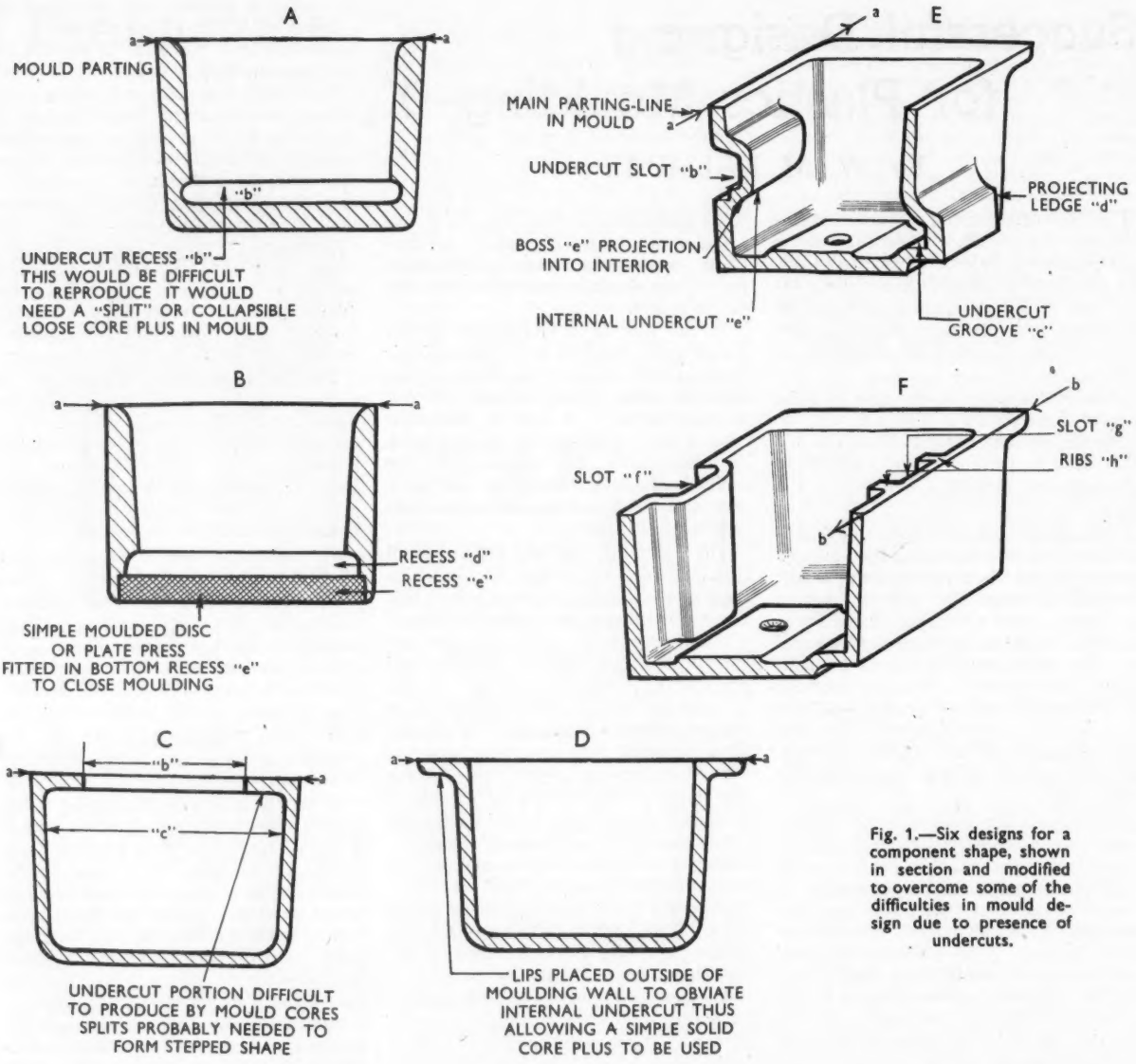


Fig. 1.—Six designs for a component shape, shown in section and modified to overcome some of the difficulties in mould design due to presence of undercuts.

has to be a depression slot or undercut, as at "b." The base of the right-hand wall is provided with an extension or projecting ledge "d." the introduction of which is necessary in order to build up sufficient wall thickness around the undercut groove "c" formed internally in the part.

On the floor of the component a raised seating has to be provided, this portion having a cored hole clean through. The axis of this cored hole is truly perpendicular to the parting-line surface "a—a."

It will be specially noted that these requirements entail the formation of three awkwardly situated undercuts on the inside walls of the component. Reproduction of these would present certain difficulties when coring the mould. With either a compression or an injection mould a split-type core would be necessary. Furthermore, it may be found during actual moulding, that considerable troubles would arise in regard to the contraction of the part upon cooling. Owing to the shape, such contraction would be unequalized resulting in the distortion of side walls or base.

The design shown at F illustrates the manner in which the original design form (E) may be modified to eliminate the afore-mentioned mould construction and operation difficulties, by the complete removal of the offending undercuts "b," "c" and "e."

Referring to this latter illustration it will be observed that the left-hand vertical wall has been altered so as to produce a slot "f." This slot extends throughout the full height of the side as shown, and it will be formed by a simple integral projection left on the side of the female portion of the cavity in the bottom block. The male core plug carried in the top block would be similarly hollowed out to give the requisite wall thickness around the slot.

The right-hand vertical side wall of the component is left perfectly straight, thus eliminating altogether the raised projection ledge "d." On the inside surface of this wall a slot "g" is provided by the introduction of a pair of ribs "h." These members extend from the parting-line surface "a—a" down the base of the component, thus providing a recess down the inside of the part to give a comparable recess with that required in the original design depicted at E.

These portions are capable of being reproduced very simply by cutting two slots vertically into the side of the male core plug housed in the upper block. The width of such slots would be equivalent to the width of rib desired. The seating and hole formed on the inside floor of the

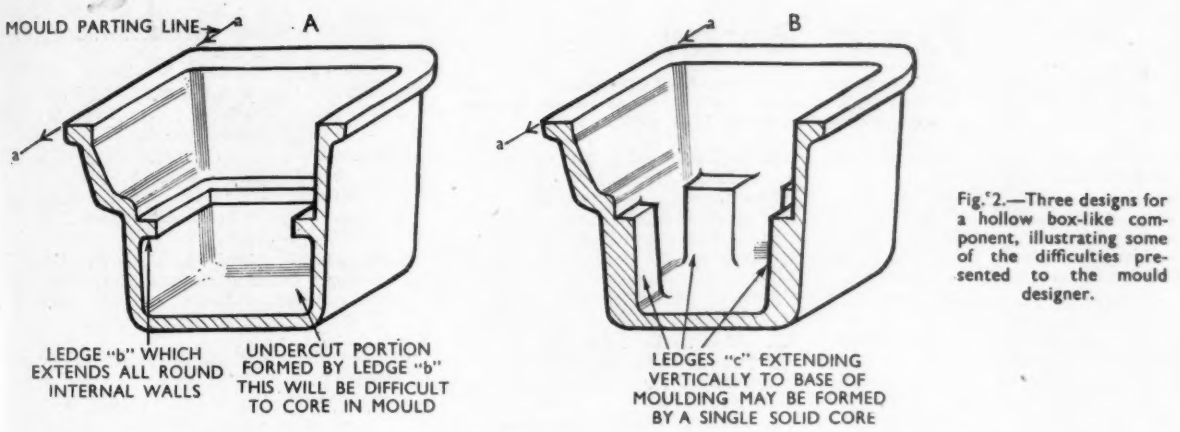

MOULD PARTING LINE
a
A
a
B
a
LEDGE "b" WHICH EXTENDS ALL ROUND INTERNAL WALLS
UNDERCUT PORTION FORMED BY LEDGE "b" THIS WILL BE DIFFICULT TO CORE IN MOULD
LEDGES "c" EXTENDING VERTICALLY TO BASE OF MOULDING MAY BE FORMED BY A SINGLE SOLID CORE

Fig. 2.—Three designs for a hollow box-like component, illustrating some of the difficulties presented to the mould designer.

container will, of course, be readily formed by a recess and small core pin located on the endface of the core plug in the upper block.

These modifications ensure a much simpler design form, which will be reflected in a less complicated type of mould construction, and, of course, increased rate of output of the components. Less troubles are likely to arise in respect of shrinkage pressures and distortion of the walls of the article.

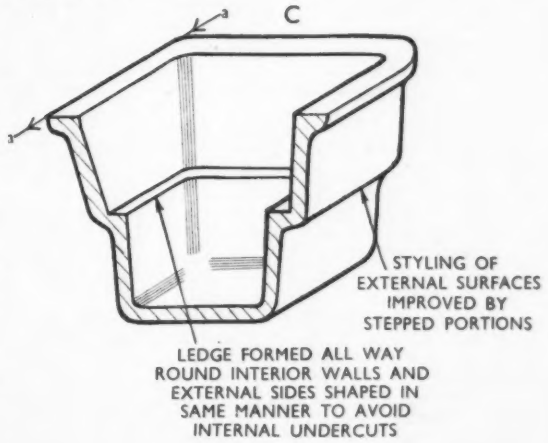
The three designs given at Fig. 2 illustrate yet another very common component requirement which may sometimes offer difficulties to the mould designer. It is a type worthy of brief mention at this stage, before leaving the subject of undercuts.

The first illustration (A) gives a sectioned opened view of a hollow-box component. Half-way down the inside walls there has to be provided a short ledge extension as at "b," extending all the way round the inside as indicated. Such a ledge will create a substantial undercutting of the inside shape, which again, for the reason already noted in respect of the preceding examples, will cause increased complication of the mould construction.

A much more preferable design form is shown at B (Fig. 2). Instead of a continuous ledge running all round the inside walls, however, a series of ledges or bosses of the kind shown at "c" are employed. These are more or less equally disposed along each wall, four of these portions being shown in the diagram. Each boss is extended right to the internal floor of the moulding in the manner depicted.

The important feature to be noted in respect of these provisions is that all the bosses can be readily formed from a solid single-piece core plug carried in the upper mould block. The sides of this core would be recessed out at the required locations, and for a sufficient depth and width to produce the boss projections. A finished component could then be readily drawn off the core at right-angles to the parting-line "a—a" to ensure very simple operation of the tool.

One drawback with this adaptation, however, is that it results in a substantial thickening up of the side walls across the points where these bosses are situated, and the attendant troubles previously mentioned might accrue. If these bosses, however, were only to be required for the location of another member, and were not subjected to any great stressing or loading, they would have sufficient strength and rigidity.


a
C
STYLING OF EXTERNAL SURFACES IMPROVED BY STEPPED PORTIONS
LEDGE FORMED ALL WAY ROUND INTERIOR WALLS AND EXTERNAL SIDES SHAPED IN SAME MANNER TO AVOID INTERNAL UNDERCUTS

The design shown at C (Fig 2) is perhaps the best and most economical adaptation capable of being made to the original design.

With this design form it will be noted that the inside opening has been shaped to produce a square step internally in the part. The opening below this step is continued to the base at substantially the same dimension in regard to width, allowance being made for the necessary core withdrawal draft, of course.

The external walls are similarly shaped to follow the internal contours in the manner illustrated. The design results in a certain economy of material, whilst the large, flat external surfaces on the walls are broken by a rounded step whose effect is to improve the general styling and appearance of the component.

The internal shape may be produced easily from a single solid core plug, as with the example given at B. This is a most economical and satisfactory design form and is one likely to lead to the least degree of operating trouble, or control over the sizes of the finished part.

These examples will afford useful guidance to component-designers as to the nature of the problems arising from the injudicious introduction of undercut portions on either the inside or outside walls of a component. Very often sufficient latitude can be given respecting the modification of the internal and external shape to avoid use of such undesirable features, along lines similar to those suggested and illustrated here.

It is vitally important always to bear in mind the necessity to select those forms which do not obstruct the extraction of cores. Those shapes and forms are to be preferred which do not involve splits or collapsible-type core plugs for their reproduction, thereby promoting greater simplification of mould construction, reduced costs for such tools, and simpler operation of the mould to give increased production service.

(To be continued).

Forthcoming Meeting

May 16.—"Plastics in Relation to Local Industries." H. V. Potter (Bakelite, Ltd.). Society of Chemical Industry—Plastics and Polymer Group, and South-Western Section, Plymouth.

Books Received

"Acetylene and Carbon Monoxide Chemistry." By J. W. Copenhaver and M. H. Bidelow. London: Chapman and Hall. 60s.

"Modern Plastics," 2nd Edition. By H. Barron. London: Chapman and Hall. 50s.

"Phenolic Resins—Their Chemistry and Technology." By P. Robitsclek and A. Lewin. London: Iliffe and Sons. 30s.

PATENT REVIEW

The following abstracts have been made from specifications at the Patent Office, with the permission of the Controller of H.M. Stationery Office. Complete specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 2/- each.

B.P. 633,941. Appl. 24.5.44 Conv. (U.S.A.) 26.7.43. Acc. 30.12.49.

Plasticized synthetic resin compositions. Glenn L. Martin Co.

Vinyl chloride copolymers plasticized with di-isobutyl adipate which acts at the same time as stabilizer for the compound.

B.P. 633,973. Appl. 26.9.47. Conv. (U.S.A.) 30.10.46. Acc. 30.12.49.

Organo-Polysiloxane compositions. Westinghouse Electric International Co.

Polysiloxane resin compositions for the impregnation of glass-fibre material and the like consisting of phenyl alkyl siloxane polymerized in the presence of hydrogenated terphenyl.

B.P. 634,071. Appl. 5.2.40. Conv. (Italy) 6.2.39. Acc. 15.3.50.

Moulding plastic materials by extrusion. R. Colombo.

Multiple screw extruder with inter-meshing screws, arranged either in a row or in a circular pattern.

B.P. 634,077. Appl. 14.1.46. Conv. (U.S.A.) 2.2.45. Acc. 15.3.50.

Poly-N-vinyl pyrrole compounds, moulding composition and process. W. F. Busse and J. M. Lambert. To: General Aniline and Film Corporation.

B.P. 634,105. Appl. 29.1.48. Acc. 15.3.50.

Improvements relating to machines for pelletising rubber and other plastic materials. F. E. Brown.

Extrusion press with special die-chamber for pelletising rubber or plastics.

B.P. 634,126. Appl. 3.7.47. Conv. (U.S.A.) 2.8.46. Acc. 15.3.50.

Improvements in or relating to a method of producing synthetic, water-insoluble, viscous liquid thermosetting resins and the products resulting therefrom. To: The Quaker Oats Co.

Refers to thermosetting resins derived from furfuryl alcohol, ammonium thiocyanate and an aldehyde.

B.P. 634,140. Appl. 24.2.48. Conv. (U.S.A.) 6.6.42. Acc. 15.3.50.

Production of hydrolyzed ethylene interpolymers. To: Imperial Chemical Industries, Ltd.

B.P. 634,172. Appl. 21.11.46. Conv. (U.S.A.) 5.6.46. Acc. 15.3.50.

Polyamide condensation polymers. To: Wingfoot Corporation.

B.P. 634,216. Appl. 1.5.47. Acc. 15.3.50.

Processes of preparing polyvinyl acetate emulsions. To: Shawinigan Resins Corp.

Production of polyvinyl acetate emulsions which yield exceptionally clear and water-resistant films by polymerizing an aqueous vinyl acetate dispersion in the presence of a water-soluble persulphate or an iron compound together with hydrogen peroxide, a hydrophilic colloid and an alkali metal salt of a sulphated or sulphonated organic compound.

B.P. 634,234. Appl. 18.7.47. Conv. (U.S.A.) 20.3.44. Acc. 15.3.50.

Injection moulding machines To: Lester Eng. Co.

Design of dies for high-pressure injection moulding machines, in particular arrangement for heating "torpedos."

B.P. 634,235. Appl. 21.7.47. Conv. (U.S.A.) 19.7.46. Acc. 15.3.50.

Improvements in polyamides To: E. I. du Pont de Nemours and Co.

Production of synthetic linear polyamides by blending a molten linear polyamide with 2 oleato-ethanesulphonate or 2-(N-methyl oleamido) ethanesulphonate under a blanket of an inert gas at elevated temperatures.

B.P. 634,422. Appl. 19.12.47. Conv. (Belgium) 24.10.46. Acc. 22.3.50.

Adhesives for nylon. Imperial Chemical Industries.

Solution of nylon in phenols, cresols or xylenols used as cement for joining nylon to nylon.

B.P. 634,445. Appl. 13.2.47. Conv. (U.S.A.) 16.2.46. Acc. 22.3.50.

Method and apparatus for moulding tubing. Bakelite Corporation.

Improved extruding machine for the production of accurately controlled thermoplastic extrusions of tubular shape.

B.P. 634,465. Appl. 10.12.48. Acc. 22.3.50.

A new or improved decorative stripping. J. Veit. To: Duratube and Wire, Ltd.

Thermoplastic extrusions suitable for the manufacture of belts, handbags, etc.

B.P. 634,503. Appl. 3.3.47. Conv. (U.S.A.) 25.9.46. Acc. 22.3.50.

Improvements in or relating to emulsion polymerization. Wingfoot Corporation.

Emulsion polymerization of hydrocarbon di-olefine (40-100 per cent.) and a mono-olefinic monomer (0-60 per cent.) under heat and presence of a catalyst.

B.P. 634,570. Appl. 3.6.46. Acc. 22.3.50.

Modified resin compositions. Lewis Berger and Sons, Ltd.

Printing ink bases consisting of interpolymerization products of a resin acid and a styrene compound.

B.P. 634,587. Appl. 24.6.48. Acc. 22.3.50.

Manufacture of styrene compounds. F. E. Salt, W. Webster and J. Galitzenstein.

A chlorethyl benzene is heated in the presence of collidine in a concentration exceeding 0.2 per cent. by weight at a temperature lower than the boiling point of the chlorethyl compound.

B.P. 634,591. Appl. 21.7.48. Acc. 22.3.50.

Production of synthetic resins. J. W. Fisher and E. W. Wheatley. To: British Celanese, Ltd.

Production of synthetic resins by reacting formaldehyde with a hydrazide of a dicarboxylic acid or a polycarboxylic acid.

B.P. 634,600. Appl. 15.8.47. Conv. (U.S.A.) 16.8.46. Acc. 22.3.50.

Process for improving the tensile strength of polymeric materials. E. I. du Pont de Nemours.

Stress-orientation of polymer filaments by cold drawing.

B.P. 634,609. Appl. 12.11.46. Acc. 22.3.50.

Production of polyesters. J. G. N. Drewitt and J. Lincoln. To: British Celanese, Ltd.

Manufacture of fibre-forming polymers and polymers suitable for coating compositions.

B.P. 634.643. Appl. 3.6.46. Conv. (U.S.A.) 2.6.45. Acc. 22.3.50.

Method of and apparatus for heating granular moulding material I. W. Cox. To: Igranic Electric Co.

Heating of moulding powder or granules in transfer moulding processes by induction heating a cylindrical hopper to 1,000 degrees F. Material passes through this hopper.

B.P. 634,647. Appl. 5.9.46. Conv. (U.S.A.) 6.11.45. Acc. 22.3.50.

Polymerization in aqueous dispersion of polymerizable organic compounds B. F. Goodrich Co.

B.P. 634,669. Appl. 20.4.48. Acc. 22.3.50.

Improvements in the stabilization of vinyl and vinylidene chloride resin compositions. F. S. Deutsch and L. H. P. Weldon. To: British Resin Products, Ltd.

Organic bismuth salts as heat and light stabilizers.

B.P. 634,673. Appl. 2.6.47. Conv. (U.S.A.) 28.6.46. Acc. 22.3.50.

Fluorinated olefine polymers. California Research Corp.

B.P. 634,717. Appl. 18.12.46. Acc. 29.3.50.

Moulding of articles from powder. F. W. May. To: Standard Telephones and Cables, Ltd.

Improvements in mould-design to obtain even pressure on all parts of a moulding during the moulding cycle. Spring loading of the bottom half of the die.

B.P. 634,757. Appl. 9.12.47. Acc. 29.3.50.

Improved catalytic Polymerization of Ethylene. Imperial Chemical Industries, Ltd. (Communication from E. I. du Pont de Nemours and Co.)

High pressure polymerization of ethylene in the presence of a catalyst of the general formula X-N=N-Y. (Where X is an aliphatic radical and Y a radical having a carbon atom attached directly to the azo nitrogen.

B.P. 634,758. Appl. 19.12.47. Conv. (France) 28.2.47. Acc. 29.3.50.

Apparatus for dielectric loss treatment. Metropolitan Vickers Electrical Co.

H.F. generator and heating chamber with one electrode as an integral part of the structure, the other electrode being attached to the movable lid of the heating chamber.

B.P. 634,762. Appl. 13.1.48. Acc. 29.3.50.

Stabilization of vinylidene chloride resins. C. A. Brighton. To: Distillers Co., Ltd.

Stabilizers for vinylidene chloride compounds based on an ester derivative of an aliphatic polyhydroxy acid. Use of this stabilizer permits the employment of steel vessels in the extrusion or moulding of polyvinylidene chloride.

B.P. 634,764. Appl. 29.1.48. Acc. 29.3.50.

Improvements relating to the manufacture of moulded articles from moulding powders. H. A. M. Winter. To: Hornflowa, Ltd.

Multi-colour button moulding using a number of preforms of a predetermined shape in order to obtain desired colour effects. See also B. Patents 566,837 and 588,635.

B.P. 634,777. Appl. 3.4.46. Conv. (U.S.A.) 24.4.45. Acc. 29.3.50.

Improved manufacture of amino-aldehyde adhesives. C. F. van Epps. To: A. F. Laucks Inc.

Adhesive for plywood with a pH value of 2.5-6.0 based on amino-aldehyde condensation products, extended with wheat flour.

B.P. 634,789. Appl. 20.2.47. Conv. (Holland) 2.5.45. Acc. 29.3.50.

A process for polymerizing unsaturated compounds in the emulsified state. N. V. Bataafsche Petroleum Mij.

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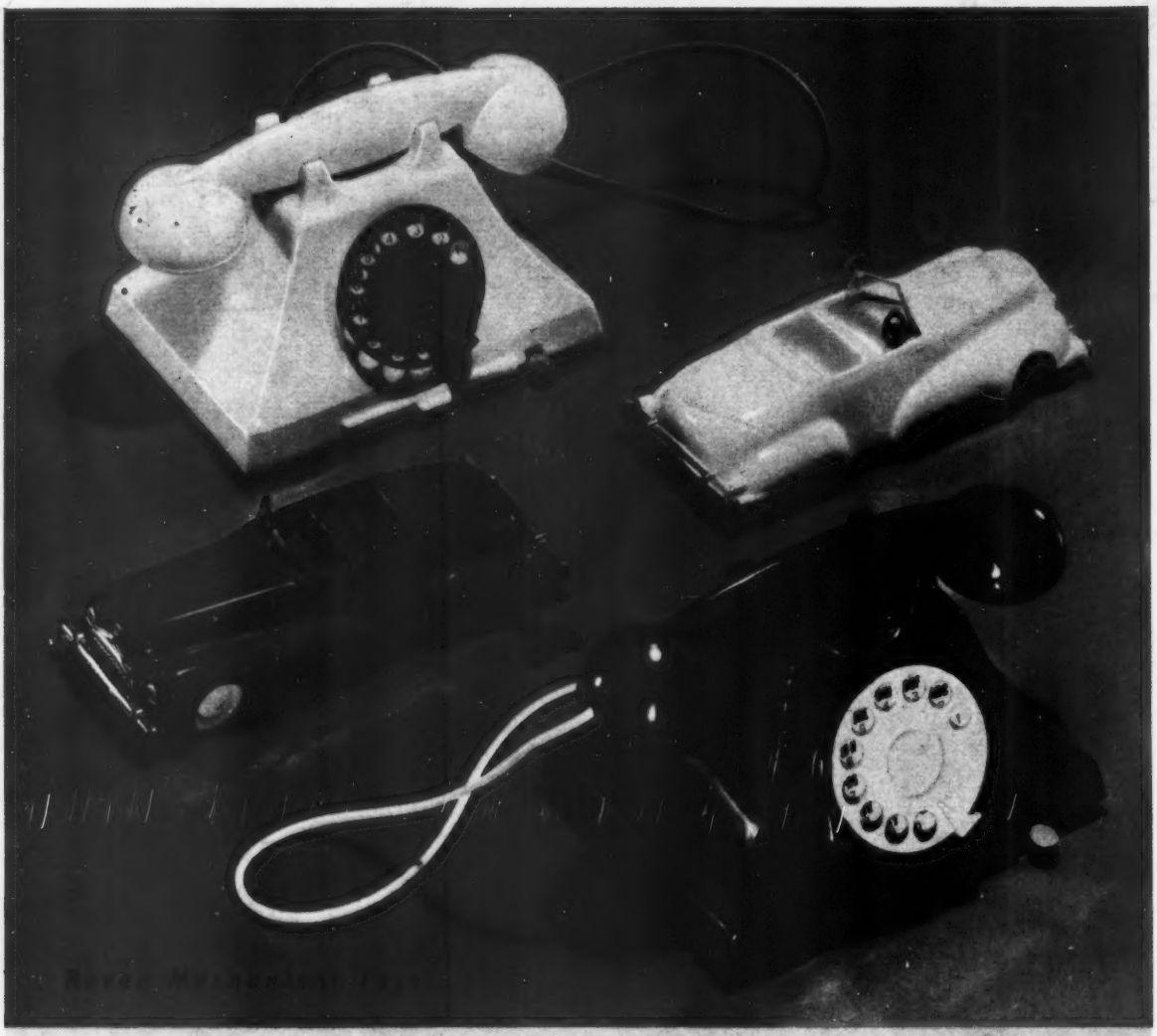

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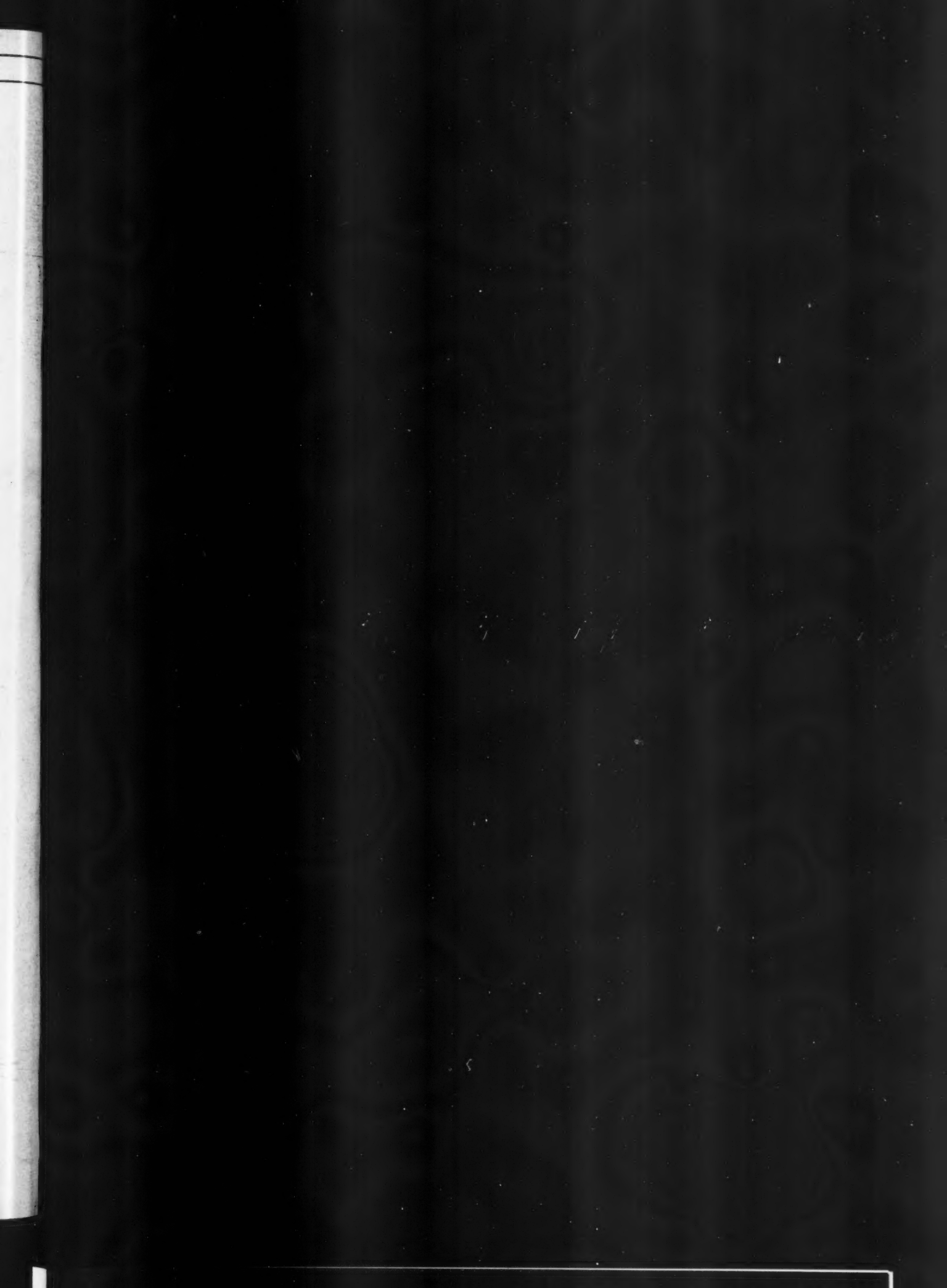
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